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MECHANICAL ABBREVIATIONS		
ABBREVIATION	(E) - EXISTING	ABBREVIATED TERM
(F)	- FUTURE	
(N)	- NEW	
AC	- AIR COOLED CHILLER	
ABV	- ABOVE	
ACC	- AIR COOLED CHILLER	
ACU	- AIR CONDITIONING UNIT	
AD	- ACCESS DOOR	
AF	- AIR FOIL	
AFF	- ABOVE FINISHED FLOOR	
AFMS	- AIRFLOW MEASURING STATION	
AFR	- ABOVE FINISHED ROOF	
AHU	- AIR HANDLING UNIT	
AL	- ACOUSTICAL LINING	
ALD	- AUTOMATIC LOUVER DAMPER	
ALT	- ALTITUDE	
APPROX	- APPROXIMATE	
ARCH	- ARCHITECTURAL	
AS	- AIR SEPARATOR	
ATC	- AUTOMATIC TEMPERATURE CONTROL PANEL	
AVG	- AVERAGE	
B	- BOILER	
BD	- BLOWDOWN	
BDD	- BACKDRAFT DAMPER	
MBH	- THOUSANDS OF BTU PER HOUR	
BF	- BELOW FLOOR	
BFW	- BOILER FEEDWATER	
BG	- BELOW GRADE	
BHP	- BRAKE HORSEPOWER	
BI	- BACKWARD INCLINE	
BO	- BLANK OFF	
BOD	- BOTTOM OF DUCT	
BOP	- BOTTOM OF PIPE	
BOR	- BOTTOM OF RACK	
BTU	- BRITISH THERMAL UNIT	
BTUH	- BRITISH THERMAL UNITS PER HOUR	
BVS	- BELTED VENT SET	
C	- COMMON	
CA	- COMPRESSED AIR	
CAV	- CONSTANT AIR VOLUME	
CC	- COOLING COIL	
CD	- CEILING DIFFUSER	
CE	- CEILING EXHAUST	
CFF	- CAP FOR FUTURE	
CFH	- CUBIC FEET PER HOUR	
CFM	- CUBIC FEET PER MINUTE	
CG	- CEILING GRILLE	
CHR	- CHILLED WATER RETURN	
CHS	- CHILLED WATER SUPPLY	
CHWR	- CHILLED WATER RETURN	
CHWS	- CHILLED WATER SUPPLY	
CL	- CENTERLINE	
CMPR	- COMPRESSOR	
CO	- CLEANOUT (DOOR)	
COEFF	- COEFFICIENT	
COND	- CONDENSATE	
CONN	- CONNECTION, CONNECT	
CONT	- CONTINUATION	
COP	- COEFFICIENT OF PERFORMANCE	
COTG	- CLEANOUT TO GRADE	
CP	- CONDENSATE PUMP	
CR	- CEILING REGISTER	
CRAC	- COMPUTER ROOM A/C UNIT	
CRU	- CONDENSATE RETURN UNIT	
CT	- COOLING TOWER	
CU	- CONDENSING UNIT	
CV	- COEFFICIENT, VALVE FLOW	
CWR	- CONDENSER WATER SUPPLY	
CWS	- CONDENSER WATER RETURN	
D	- DROP OR INDIRECT DRAIN	
DB	- DRY BULB TEMPERATURE	
DBFP	- REDUCED PRESSURE BACKFLOW PREVENTER	
DDC	- DIRECT DIGITAL CONTROL	
DEG. F	- DEGREES FAHRENHEIT	
DENS	- DENSITY	
DIA	- DIAMETER	
DN	- DOWN	
DRN	- DRAIN	
DWG	- DRAWING	
DX	- DIRECT EXPANSION	
EA	- EXHAUST AIR	
EAD	- EXHAUST AIR DUCT OR DAMPER	
EAT	- ENTERING AIR TEMPERATURE	
EDB	- ENTERING DRY BULB TEMPERATURE	
EF	- EXHAUST FAN	
EFF	- EFFICIENCY	
EP	- ELECTRO-PNEUMATIC SWITCH	
ET	- EXPANSION TANK	
EWB	- ENTERING WET BULB TEMPERATURE (°F)	
EWI	- ENTERING WATER TEMPERATURE (°F)	
EXH	- EXHAUST	
EXP	- EXPANSION	
F	- FILTER	
FSD	- COMBINATION FIRE/SMOKE DAMPER	
FA	- FIRE ALARM	
FAOP	- FIRE ALARM CONTROL PANEL	
FC	- FLEXIBLE CONNECTION	
FCU	- FAN COIL UNIT	
FD	- FIRE DAMPER	
FF	- FINAL FILTER	
FLA	- FULL LOAD AMPS	
FLR	- FLOOR	
FPI	- FINS PER INCH	
FFM	- FEET PER MINUTE	
FPS	- FEET PER SECOND	
FS	- FLOOR SINK	
FT	- FEET	
FV	- FACE VELOCITY	
GA	- GAGE or GAUGE	
GPH	- GALLONS PER HOUR	
GPM	- GALLONS PER MINUTE	
GSM	- GALVANIZED SHEET METAL	
H	- HUMIDIFIER	
HC	- HEATING COIL	
HD	- HEAD	
HDT	- HORIZONTAL DRAW-THRU	
HGT	- HEIGHT	
HOA	- HAND-OFF-AUTO	
HP	- HORSEPOWER	
HR	- HOURS	
HT	- HUMIDITY TRANSMITTER	
HTP	- HEAT PUMP	
HVAC	- HEATING, VENTILATION, AND AIR CONDITIONING	
HWR	- HOT WATER RETURN	

MECHANICAL ABBREVIATIONS		
ABBREVIATION		ABBREVIATED TERM
HWS	- HOT WATER SUPPLY	
HX	- HEAT EXCHANGER	
IAC	- INSTRUMENT AIR COMPRESSOR	
IAS	- INSTRUMENT AIR SUPPLY	
ID	- INSIDE DIMENSION	
IN	- INCHES	
INV	- INVERT ELEVATION	
KEF	- KITCHEN EXHAUST FAN	
KSF	- KITCHEN SUPPLY FAN	
KW	- KILOWATT	
KWH	- KILOWATT HOUR	
LAT	- LEAVING AIR TEMPERATURE	
LBS	- POUNDS	
LBS/HR	- POUNDS PER HOUR	
LD	- LINEAR DIFFUSER	
LVR	- LOUVER	
LWT	- LEAVING WATER TEMPERATURE	
M	- MAIN AIR	
MA	- MAKEUP AIR	
MAT	- MIXED AIR TEMPERATURE	
MAU	- MAKEUP AIR UNIT	
MAX	- MAXIMUM	
MB	- MANUAL BALANCE DAMPER	
MCA	- MINIMUM CIRCUIT AMPS	
MCC	- MOTOR CONTROL CENTER	
MCD	- MOISTURE CONDENSATE DRAIN	
MFG	- MANUFACTURER	
MIN	- MINIMUM	
ML	- MARINE LIGHT	
MMS	- MANUAL MOTOR START	
MVD	- MANUAL VOLUME DAMPER	
N/A	- NOT APPLICABLE	
NC	- NORMALLY CLOSED	
NIC	- NOT IN CONTRACT	
NK	- NECK	
NO	- NORMALLY OPEN or NUMBER	
NPSH	- NET POSITIVE SUCTION HEAD	
NPSHa	- NET POSITIVE SUCTION HEAD AVAILABLE	
NPSHr	- NET POSITIVE SUCTION HEAD REQUIRED	
NTS	- NOT TO SCALE	
OA	- OUTSIDE AIR	
OD	- OPPOSED BLADE DAMPER	
OD	- OUTSIDE DIMENSION	
ORD	- OVERFLOW ROOF DRAIN	
P	- PUMP	
PC	- PUMPED CONDENSATE	
PCR	- PUMPED CONDENSATE RETURN	
PD	- PRESSURE DROP	
PE	- PNEUMATIC-ELECTRO	
PF	- PRE-FILTER	
PG	- PIPE GUIDE	
PH	- PHASE (ELECTRICAL)	
PHC	- PREHEAT COIL	
POC	- POINT OF CONNECTION	
PR	- PRESSURE RELIEF	
PRESS	- PRESSURE	
PRV	- PRESSURE REDUCING VALVE	
PSI	- POUNDS PER SQUARE INCH	
PSIG	- POUNDS PER SQUARE INCH GAUGE	
R	- RISE	
RA	- RETURN AIR	
RAD	- RETURN AIR DUCT	
RAF	- RETURN AIR FAN	
RCVR	- RECEIVER	
RD	- ROOF DRAIN	
RF	- RETURN FAN	
RH	- RELATIVE HUMIDITY	
RHC	- REHEAT COIL	
RO	- REVERSE OSMOSIS	
RBP	- REDUCED PRESSURE BACKFLOW PREVENTER	
RPM	- ROTATIONS PER MINUTE	
S	- SANITARY SEWER	
SA	- SUPPLY AIR	
SAD	- SUPPLY AIR DUCT	
SAF	- SUPPLY AIR FAN	
SCD	- SMOKE CONTROL DAMPER	
SD	- SMOKE DAMPER	
SEC	- SECOND	
SF	- SUPPLY FAN	
SP	- STATIC PRESSURE	
SPEC	- SPECIFICATION	
SQ	- STATIC PRESSURE	
SS	- STAINLESS STEEL	
STD	- STANDARD	
STM	- STEAM	
SWE	- SIDEWALL EXHAUST GRILLE	
SWR	- SIDEWALL RETURN GRILLE	
SWS	- SIDEWALL SUPPLY GRILLE	
SYM	- SYMBOL	
SYS	- SYSTEM	
TD	- TRANSDUCER	
TDH	- TOTAL DYNAMIC HEAD	
TEMP	- TEMPERATURE	
TOL	- THERMAL OVERLOADS	
TOP	- TOP OF PIPE	
TOR	- TOP OF RACK	
TOT	- TOTAL	
TT	- TEMPERATURE TRANSMITTER	
TWU	- THRU-WALL UNIT	
TYP	- TYPICAL	
U.C.	- UNDERCUT	
UH	- UNIT HEATER	
UON	- UNLESS OTHERWISE NOTED	
V	- VOLTAGE	
VA	- VALVE	
VAV	- VARIABLE AIR VOLUME	
VERT	- VERTICAL	
VFD	- VARIABLE FREQUENCY DRIVE	
VOL	- VOLUME	
VPE	- VACUUM PUMP EXHAUST	
VT	- VENT (SANITARY)	
VTR	- VENT THRU ROOF	
W	- WATTS	
WO	- WITHOUT	
WB	- WET BULB TEMPERATURE (°F)	
WR	- WALL RETURN	
WS	- WALL SUPPLY	
WT	- WEIGHT	
WTR	- WATER	
°F	- DEGREES FAHRENHEIT	
ΔP	- PRESSURE DROP or DIFFERENTIAL	
ΔT	- TEMPERATURE DIFFERENTIAL	

MECHANICAL SYMBOLS			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY DUCT UP OR DOWN		CHILLED WATER SUPPLY
	RETURN DUCT UP OR DOWN		CHILLED WATER RETURN
	EXHAUST DUCT UP OR DOWN		CONDENSER WATER SUPPLY
	INSULATED FLEXIBLE DUCT		CONDENSER WATER RETURN
	LINED DUCTWORK		HOT WATER SUPPLY
	SQUARE TO ROUND TRANSITION		HOT WATER RETURN
	ELBOW WITH TURNING VANES		PRIMARY HOT WATER SUPPLY
	RADIUS ELBOW		PRIMARY HOT WATER RETURN
	SPLITTER DAMPER IN DUCT		REFRIGERANT SUCTION LINE
	FLEXIBLE DUCT CONNECTION		REFRIGERANT LIQUID LINE
	CEILING DIFFUSER		DRAIN LINE
	RETURN AIR GRILLE		PIPE ELBOW TURNED UP
	EXHAUST AIR GRILLE WITH SQUARE OR ROUND NECK		PIPE ELBOW TURNED DOWN
	SLOT DIFFUSER		TEE OFF BOTTOM
	MANUAL DAMPER		TEE OFF TOP
	AUTOMATIC DAMPER		DIRECTION OF FLOW
	SMOKE DAMPER		PIPE SLOPES DOWN IN DIRECTION INDICATED
	FIRE DAMPER (VERTICAL)		UNION
	FIRE DAMPER (HORIZONTAL)		PRESSURE GUAGE WITH COCK
	COMBINATION FIRE/SMOKE DAMPER (VERTICAL)		GLASS THERMOMETER
	COMBINATION FIRE/SMOKE DAMPER (HORIZONTAL)		PRESS/TEMP TEST PORT
	POINT BETWEEN DEMO & EXISTING TO REMAIN		THERMOMETER WELL
	POINT BETWEEN NEW & EXISTING WORK		FLOW SWITCH
	CHILLED WATER RISER NUMBER		FLOW METER
EG	EXHAUST GRILLE		STRAINER
LS	LINEAR SLOT DIFFUSER		GATE VALVE
RG	RETURN AIR GRILLE		2-WAY CONTROL VALVE
SG	SIDEWALL GRILLE		3-WAY CONTROL VALVE
SR	SIDEWALL REGISTER		BALL VALVE
OA	OUTSIDE AIR		CIRCUIT SETTER
EA	EXHAUST AIR		PLUG VALVE
SA	SUPPLY AIR		GLOBE VALVE
RA	RETURN AIR		SOLENOID VALVE
CFM (C)	CUBIC FEET PER MINUTE		CHECK VALVE
AP	ACCESS PANEL		BUTTERFLY VALVE
AHU	AIR HANDLING UNIT		BALANCING VALVE
FCU	FAN COIL UNIT		SIGHT GLASS
VAV	VARIABLE AIR VOLUME		REFRIGERANT EXPANSION VALVE
OAV	OUTSIDE AIR VALVE		REFRIGERANT ANGLE AND GLOBE VALVE
EAV	EXHAUST AIR VALVE		PRESSURE REDUCING VALVE
DDC	DIRECT DIGITAL CONTROLS		PRESSURE REGULATING VALVE
U	UNDERCUT IN DOOR		PRESSURE RELIEF VALVE
T	TEMPERATURE SENSOR		TEMP-PRESSURE RELIEF VALVE
H	HUMIDITY SENSOR		GUAGE COCK
TH	COMBINATION TEMP/HUMIDITY SENSOR		PET COCK (AIR VENT)
CO2	CARBON DIOXIDE SENSOR		DRAIN COCK
CO	CARBON MONOXIDE SENSOR		EXPANSION JOINT
CTL	EQUIPMENT CONTROLLER		FLEXIBLE PIPE CONNECTION
M S	MANUAL SWITCH WITH SPRING WOUND TIMER		CONCENTRIC REDUCER
SP	STATIC PRESSURE SENSOR		ECCENTRIC REDUCER
DP	DIFFERENTIAL PRESSURE SENSOR		DIAMETER AND FLAT OVAL
THIS IS A TYPICAL SCHEDULE. NOT ALL SYMBOLS ARE NECESSARILY USED ON THIS PROJECT.			

GENERAL MECHANICAL NOTES	
1	ALL STANDARDS AND SPECIFICATIONS ESTABLISHED IN THE CONSTRUCTION DOCUMENTS OR AS EVIDENCED IN THE BUILDING CONSTRUCTION SHALL GOVERN EXCEPT WHERE NOTED.
2	ALL WORK SHALL BE IN ACCORDANCE WITH REQUIREMENTS OF GOVERNING STATE AND LOCAL FIRE AND BUILDING CODES, & NFPA CODE 101. THESE CODES SHALL BE FOLLOWED AS A MINIMUM, PROVIDING HIGHER GRADES OF MATERIALS AND WORKMANSHIP WHERE REQUIRED. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION, AND LOCAL REGULATORY AGENCIES.
3	THE DRAWINGS INDICATE GENERAL DESIGN AND ARRANGEMENT OF PIPES, DUCTWORK, EQUIPMENT, AND SYSTEMS. DRAWINGS ARE DIAGRAMMATIC IN NATURE, AND DO NOT INDICATE ALL REQUIRED OFFSETS, FITTINGS, ETC. FOLLOW DRAWINGS AS CLOSE AS ACTUAL CONSTRUCTION AND THE WORK OF OTHER TRADES PERMITS. PROVIDE ALL MINOR INCIDENTAL ITEMS SUCH AS FITTINGS, OFFSETS, ETC. AS REQUIRED, EVEN IF NOT SPECIFICALLY SHOWN ON THE DRAWINGS, OR INDICATED IN THE SPECIFICATIONS. INSTALL ALL PIPING AND DUCTWORK TO BEST SUIT FIELD CONDITIONS AND COORDINATE WITH THE INSTALLATION WORK OF OTHER TRADES. THE DRAWINGS SHALL NOT BE SCALED TO DETERMINE EXACT LOCATIONS OF PIPING OR DUCTWORK.
4	THE CONTRACTOR SHALL INSPECT THE BUILDING OR WORK SITE PRIOR TO BID, TO VERIFY THAT THERE IS ADEQUATE CLEARANCE FOR THE PROPOSED MECHANICAL INSTALLATION, IN THE EVENT THE CONTRACTOR HAS OBSERVED A DISCREPANCY, OR FORESEES A PROBLEM, HE MUST NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY. THE BID SHALL SERVE AS EVIDENCE OF THE CONTRACTOR'S KNOWLEDGE OF EXISTING CONDITIONS. NO ADDITIONAL PAYMENT WILL BE MADE TO THE CONTRACTOR FOR FIELD CHANGES REQUIRED TO COORDINATE THE EXISTING BUILDING SYSTEMS WITH NEW CONSTRUCTION FOLLOWING THE SUBMITTAL OF BID, WITH THE EXCEPTION OF HIDDEN CONDITIONS, AND UNFORESEEN CIRCUMSTANCES, WHICH MUST BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER AND THE BUILDING MANAGEMENT IMMEDIATELY WHEN OBSERVED.
5	PROVIDE ALL CONCRETE PADS, SPECIAL SUPPORTS AND ANCHORING FOR ALL MECHANICAL EQUIPMENT REQUIRING SUCH.
6	THIS CONTRACTOR IS RESPONSIBLE FOR ALL ASPECTS OF JOB-SITE SAFETY. THE ARCHITECT/ENGINEER IS NOT RESPONSIBLE FOR MEANS, METHODS AND SAFETY MEASURES EMPLOYED BY THE CONTRACTOR IN THE INSTALLATION OF THE WORK DEPICTED ON THESE DRAWINGS.
7	REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF PARTITIONS, WALLS, PLUMBING FIXTURES, AND GENERAL CONSTRUCTION. INSTALL ALL PIPING AND DUCTWORK TO AVOID ARCHITECTURAL FRAMING, STRUCTURAL MEMBERS, AND OTHER OBSTRUCTIONS. COORDINATE PIPING AND DUCTWORK LOCATION WITH ALL APPLICABLE CONTRACT DRAWINGS PRIOR TO PLACING SLEEVES IN FLOORS OR WALLS.
8	CONTRACTOR SHALL X-RAY FLOOR SLAB AS NECESSARY TO CONFIRM LOCATION OF STRUCTURAL ELEMENTS AND OBJECTS EMBEDDED IN, OR ATTACHED TO THE SLAB PRIOR TO MAKING ANY PENETRATIONS INTO THE SLAB.
9	MECHANICAL DUCTWORK TAKES PRECEDENCE OVER ALL OTHER SYSTEMS INSTALLED IN CEILING CAVITY. COSTS ASSOCIATED WITH RE-ROUTING INSTALLED COMPONENTS DUE TO LACK OF COORDINATION IS THE GENERAL CONTRACTOR'S RESPONSIBILITY.
10	THE CONTRACTOR SHALL WARRANT ALL WORK FOR A PERIOD OF ONE (1) YEAR FOLLOWING ACCEPTANCE OF THE WORK BY THE BUILDING OWNER OR AS DEFINED IN THE SPECIFICATIONS, WHICHEVER IS GREATER.
11	PROVIDE "FLEX-FLOW ELBOWS" AT ALL CEILING DIFFUSERS TO LIMIT LOW AIRFLOW ISSUES ASSOCIATED WITH FLEXIBLE DUCT KINKAGE.
12	MAX FLEXIBLE DUCT RUN TO DIFFUSERS SHALL NOT EXCEED 6 FEET. PROVIDE SHEETMETAL RUN-OUTS AS REQUIRED TO ENSURE THIS REQUIREMENT IS MET.
13	ALL DRAWINGS ARE SCHEMATIC IN NATURE. CONTRACTOR IS REQUIRED TO FULLY COORDINATE WORK BETWEEN TRADES & PROVIDE NECESSARY OFFSETS/TRANSITIONS REQUIRED TO ENSURE ALL SYSTEMS FIT IN ALLOCATED SPACE. PROVIDE COORDINATED SHOP DRAWINGS PER SPECIFICATIONS FOR REVIEW PRIOR TO INSTALL.
14	ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS. IN THE EVENT OF A DISCREPANCY BETWEEN CONTRACT DRAWINGS AND SPECIFICATIONS, THE MOST STRINGENT SHALL GOVERN.
15	PROVIDE ACCESS PANELS FOR ALL CONCEALED EQUIPMENT REQUIRING ACCESS. SIZE & LOCATION TO BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
16	SEE ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT DIFFUSER LOCATIONS AND FINISHED CEILING.
17	COORDINATE LOCATIONS OF ACCESS DOORS WITH FIRE DAMPERS, VOLUME DAMPERS, SMOKE DAMPERS, ETC. THE OPENING SHALL BE LARGE ENOUGH TO PERMIT MAINTENANCE AND RESETTING OF THE DEVICE. CONTRACTOR TO COORDINATE WITH ARCHITECT'S CEILING ACCESS PANELS FOR ALL FIRE, SMOKE AND VOLUME DAMPERS IN INACCESSIBLE CEILING AS REQUIRED.
18	PROTECT ALL EQUIPMENT & MATERIALS FROM DAMAGE. SEAL ENDS OF OPEN DUCTWORK & PIPING DURING CONSTRUCTION TO PREVENT ENTRY OF DUST & DEBRIS.
19	ALL DUCT DIMENSIONS ARE INSIDE CLEAR (AIRSTREAM) DIMENSIONS.
20	ALL MECHANICAL RELATED PENETRATIONS THROUGH ROOF SHALL HAVE CURBS (SUPPLIED BY MECHANICAL CONTRACTOR) AND SHALL BE INSTALLED BY ROOFING CONTRACTOR TO ENSURE A PROPER WATERPROOF SEAL.
21	CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO THE FABRICATION OF DUCTWORK AND PIPING COMPONENTS. CAREFULLY COORDINATE LOCATION OF EQUIPMENT AND DUCTWORK WITH CEILING, LIGHT FIXTURES, DIFFUSERS, GRILLES, PIPES, CONDUITS, STRUCTURAL ELEMENTS, AND THE WORK OF OTHER TRADES.
22	MECHANICAL CONTRACTOR TO PROVIDE SHIM TO LEVEL ALL EQUIPMENT ON THE FLOOR.
23	RUN-OUTS TO DIFFUSERS SHALL BE THE SAME SIZE AS DIFFUSER NECK SIZE. PROVIDE TAKE-OFF FITTING WITH MANUAL DAMPER (FLEXMASTER STOOD OR EQUAL) AT TRUNK DUCT FOR ALL DIFFUSER BRANCH CONNECTIONS.
24	RUN-OUTS TO VAV BOXES SHALL BE SAME SIZE AS VAV INLET UNLESS NOTED OTHERWISE. FLEXIBLE DUCT IS PROHIBITED ON INLET TO VAV BOXES.
25	ALL EQUIPMENT ON THE PREMISES IS THE PROPERTY OF THE BUILDING OWNER/BUILDING MANAGEMENT. THIS CONTRACTOR SHALL TURN OVER ALL REMOVED EQUIPMENT TO THE BUILDING OWNER/BUILDING MANAGEMENT, OR DISPOSE OF THE EQUIPMENT IN ACCORDANCE WITH THE BUILDING OWNER/BUILDING MANAGER INSTRUCTIONS.
26	RECTANGULAR DUCTS MAY BE CHANGED TO ROUND OR OVAL DUCTS WHERE SPACE IS A CONCERN. THE DUCT SIZES OF THE NEW ROUND OR OVAL DUCTS SHALL BE EQUIVALENT TO THE RECTANGULAR DUCT IT REPLACES. SEE EQUIVALENT DUCT SIZE SCHEDULE FOR A SHORT LIST OF ACCEPTABLE SIZE CHANGES.
27	ROUTE CONDENSATE FROM ALL FAN COIL UNITS AND AIR HANDLING UNITS TO THE NEAREST DRAIN. COORD

SHEET REFERENCE NOTES

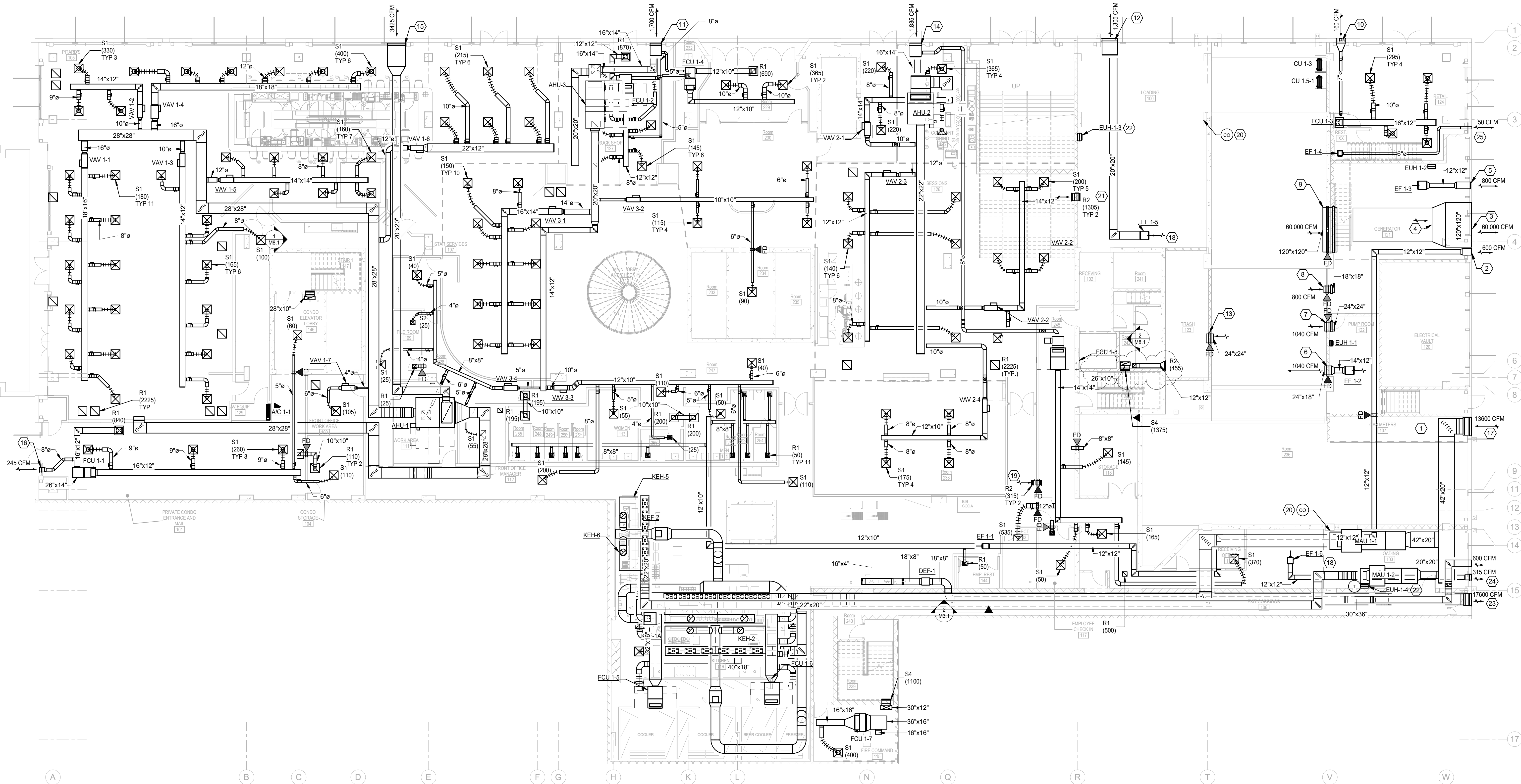
- 1 GAS METER ROOM SHALL HAVE A 5'-0" MINIMUM LOUVERED DOUBLE DOOR PER ENERGY REQUIREMENTS.
- 2 0.9 SF FREE AREA EXHAUST LOUVER IN EXTERIOR WALL. ROUTE EXHAUST DUCT TO CONNECT INTO EXTERIOR LOUVER SYSTEM.
- 3 ROUTE RADIATOR EXHAUST DUCT TO CONNECT INTO EXTERIOR LOUVER SYSTEM.
- 4 CONNECT DUCT TO RADIATOR. TRANSITION TO OPENING SIZE OF LOUVER.
- 5 1 SF FREE AREA EXHAUST LOUVER WITH MAX 0.1" WC PRESSURE DROP IN EXTERIOR WALL. ROUTE EXHAUST DUCT TO CONNECT INTO EXTERIOR LOUVER SYSTEM.
- 6 1.3 SF FREE AREA EXHAUST LOUVER SIZED FOR MAX 0.1" WC PRESSURE DROP.
- 7 1.3 SF FREE AREA MAKE UP AIR LOUVER SIZED FOR MAX 0.1" WC PRESSURE DROP. PROVIDE GRAVITY SHUTTER DAMPER ON THE BACK END OF UNIT.
- 8 1 SF FREE AREA MAKE UP AIR LOUVER WITH MAX 0.1" WC PRESSURE DROP. PROVIDE AUTOMATIC DAMPER TO THE BACK END OF THE UNIT. DAMPER SHALL BE INTERLOCKED TO OPEN WHEN GENERATOR AND/OR EXHAUST FAN IS ACTIVATED.
- 9 75 SF FREE AREA MAKE UP AIR LOUVER WITH MAX 0.1" WC PRESSURE DROP. LOUVER WILL CONSIST OF MULTIPLE SECTIONS WITH A MULLION. PROVIDE AUTOMATIC DAMPER TO THE BACK END OF THE UNIT. DAMPER SHALL BE INTERLOCKED TO OPEN WHEN GENERATOR IS ACTIVATED.

SHEET REFERENCE NOTES

- 10 0.3 SF FREE AREA OUTSIDE AIR LOUVER WITH MAX .1" WC PRESSURE DROP IN EXTERIOR WALL. COORDINATE WITH ARCHITECTURAL.
- 11 2.2 SF FREE AREA OUTSIDE AIR LOUVER WITH MAX 0.1" WC PRESSURE DROP IN EXTERIOR WALL. COORDINATE WITH ARCHITECTURAL. PROVIDE SHEET METAL PLENUM OFF THE BACK OF THE LOUVER UNIT AS SHOWN.
- 12 1.65 SF FREE AREA EXHAUST AIR LOUVER WITH MAX .1" WC PRESSURE DROP AT 1305 CFM IN EXTERIOR WALL. COORDINATE WITH ARCHITECTURAL. PROVIDE SHEET METAL PLENUM OFF THE BACK OF THE LOUVER UNIT AS SHOWN.
- 13 0.4 SF FREE AREA MAKE UP AIR LOUVER WITH MAX 0.1" WC PRESSURE DROP IN EXTERIOR WALL. COORDINATE WITH ARCHITECTURAL. PROVIDE GRAVITY DAMPER ON BACK END OF UNIT.
- 14 2.3 SF FREE AREA MAKE UP AIR LOUVER WITH MAX 0.1" WC PRESSURE DROP IN EXTERIOR WALL. COORDINATE WITH ARCHITECTURAL. PROVIDE SHEET METAL PLENUM OFF THE BACK OF THE LOUVER UNIT AS SHOWN.
- 15 4.3 SF FREE AREA MAKE UP AIR LOUVER WITH MAX 0.1" WC PRESSURE DROP IN EXTERIOR WALL. COORDINATE WITH ARCHITECTURAL.
- 16 0.3 SF FREE AREA MAKE UP AIR LOUVER WITH MAX 0.1" WC PRESSURE DROP IN EXTERIOR WALL. COORDINATE WITH ARCHITECTURAL.
- 17 0.7 SF FREE AREA MAKE UP AIR LOUVER WITH MAX 0.1" WC PRESSURE DROP IN EXTERIOR WALL. COORDINATE WITH ARCHITECTURAL. PROVIDE SHEET METAL PLENUM OFF THE BACK OF THE LOUVER UNIT AS SHOWN.

SHEET REFERENCE NOTES

- 18 INTERLOCK EXHAUST FAN WITH OVERHEAD DOOR. EXHAUST FAN SHALL RUN WHEN DOOR OVERHEAD DOOR IS CLOSED.
- 19 12"x18" TRANSFER OPENING WITH MOTORIZED DAMPER. PROVIDE TRANSFER GRILLE ON BOTH SIDES. INSTALL BOTTOM OF OPENING AT 0'-8" ABOVE RECEIVING FLOOR. INTERLOCK DAMPER SO THAT IT OPENS WHEN EF 1-6 IS ENERGIZED.
- 20 INSTALL CO SENSOR 6'-0" ABOVE FINISHED FLOOR. ROUTE WIRE FOR SENSOR IN METAL CONDUIT.
- 21 18"x36" TRANSFER OPENING WITH MOTORIZED DAMPER. PROVIDE TRANSFER GRILLE R2 ON BOTH SIDES. INSTALL OPENING WITHIN CEILING CAVITY OF ADJACENT SPACE. INTERLOCK DAMPER SO THAT IT OPENS WHEN EF-1-5 IS ENERGIZED.
- 22 INSTALL BOTTOM OF ELECTRIC WALL HEATER AT 8'-0" ABOVE FINISHED FLOOR.
- 23 0.4 SF FREE AREA LOUVER WITH MAX .1" WC PRESSURE DROP AT 315 CFM IN EXTERIOR WALL. COORDINATE WITH ARCHITECTURAL. PROVIDE SHEET METAL PLENUM OFF THE BACK OF THE LOUVER UNIT AS SHOWN.
- 24 22 SF FREE AREA KITCHEN EXHAUST LOUVER WITH MAX 0.1" WC PRESSURE DROP IN EXTERIOR WALL. COORDINATE WITH ARCHITECTURAL. PROVIDE SHEET METAL PLENUM OFF THE BACK OF THE LOUVER UNIT AS SHOWN.
- 25 .07 SF FREE AREA EXHAUST LOUVER WITH MAX 0.1" WC PRESSURE DROP IN EXTERIOR WALL. ROUTE EXHAUST DUCT TO CONNECT INTO EXTERIOR LOUVER SYSTEM.



1 1ST FLOOR GROUND LEVEL - HVAC

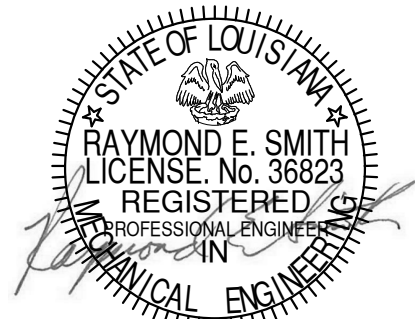
SCALE: 3/32" = 1'-0"

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central@hbsaii.com hbsaii.com
SINCE 1961

HARD ROCK
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REVISION HISTORY	
DATE	DESCRIPTION
05/18/18	
1	UPDATE

1ST FLOOR GROUND LEVEL - HVAC

PROJECT#: 1709
PHASE: PERMIT
TEAM: MEI
CHECKER: RS
SCALE: AS NOTED
ISSUED: 06/05/2018

MOSES
ENGINEERS

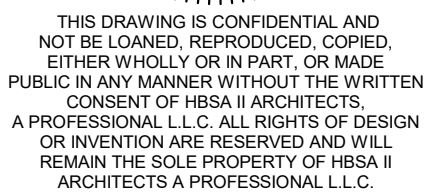
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Tel. 504-586-1725

M1.1

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INTERMEDIATE PARKING
HVAC

M1.2

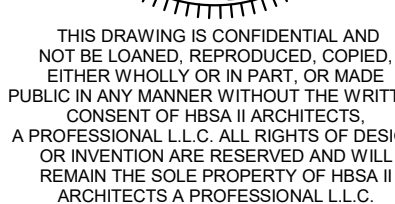


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2ND FLOOR - HVAC

MOSES
ENGINEERS

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M1.2.1

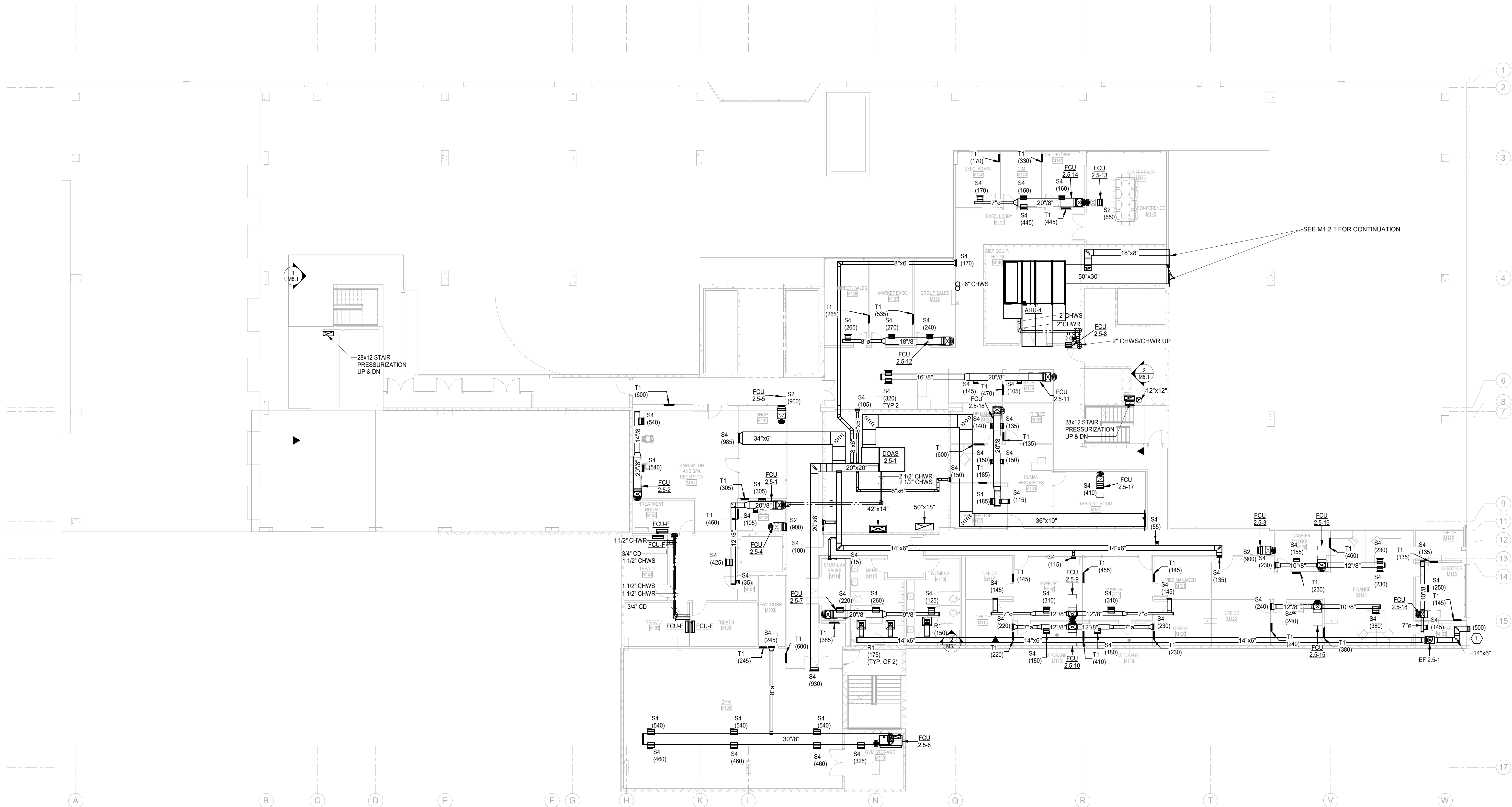
2ND FLOOR MEZZANINE
HVAC

MOSES
ENGINEERS

CONSULTING ENGINEERS
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Tel. 504-586-1725

1 2ND FLOOR MEZZANINE - HVAC

SCALE: 3/32" = 1'-0"



HB HARRY
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STATE OF LOUISIANA

RAYMOND E. SMITH
LICENSE NO. 36823
REGISTERED
PROFESSIONAL ENGINEER
IN CIVIL ENGINEERING

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3RD FLOOR ACCESSIBLE
PARKING - HVAC

PROJECT#: 1709

PHASE: PERMIT

TEAM: MEI

CHECKER: RS

SCALE: AS NOTED

ISSUED: 06/05/2018

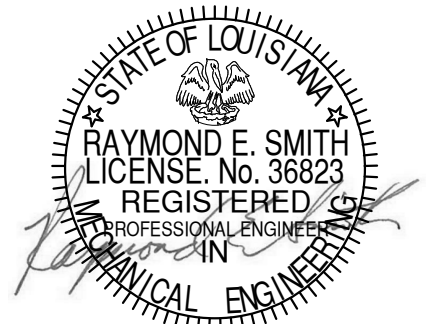
M1.3



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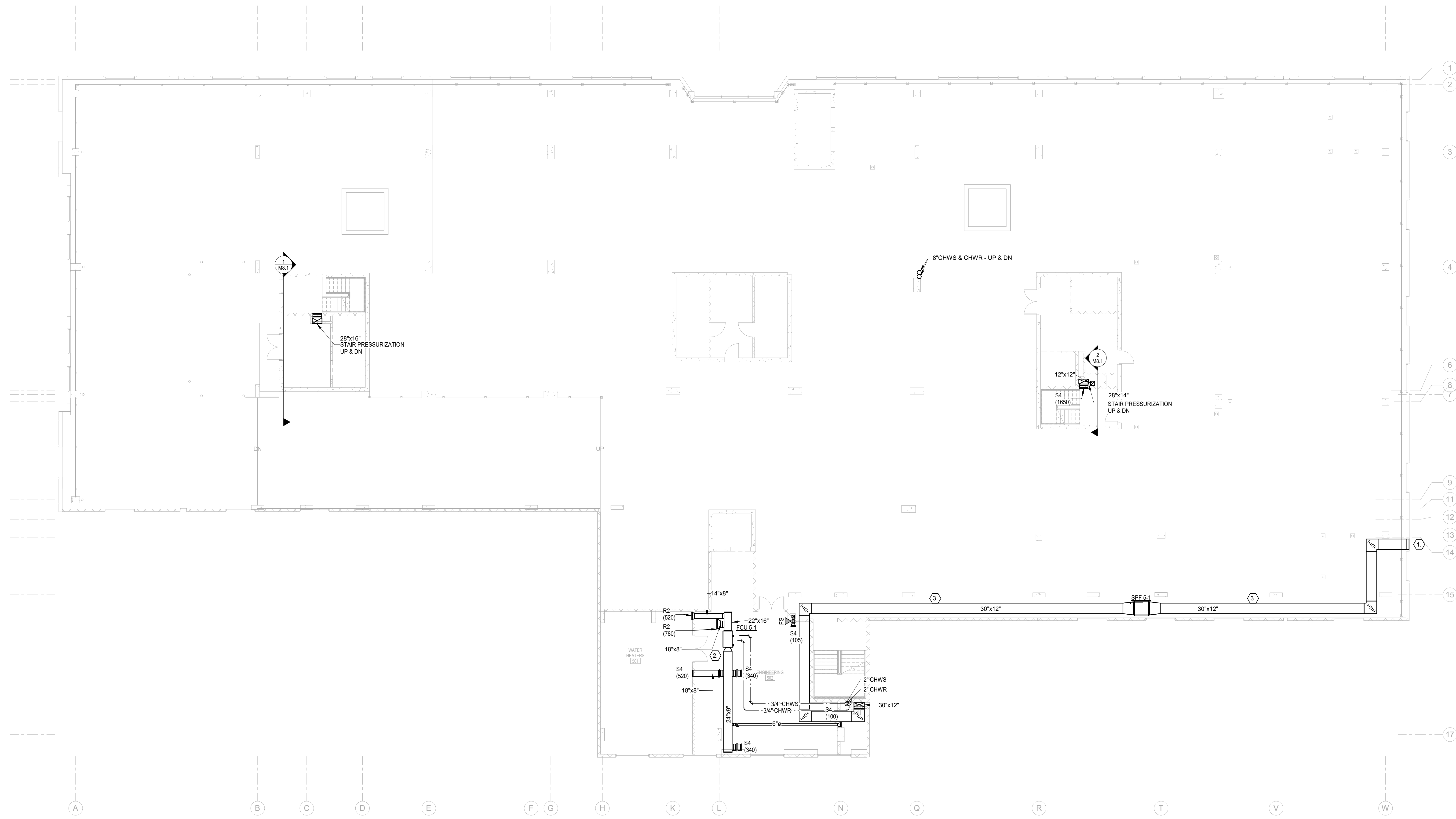
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5TH FLOOR PARKING -
HVAC

PROJECT#: 1709
PHASE: PERMIT
TEAM: MEI
CHECKER: RS
SCALE: AS NOTED
ISSUED: 06/05/2018

M1.3.2



1 5TH FLOOR PARKING - HVAC

SCALE: 3/32" = 1'-0"

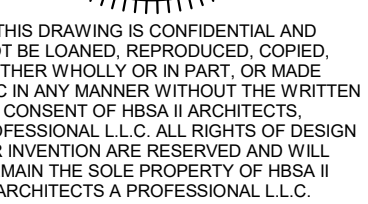
MOSES
ENGINEERS

CONSULTING ENGINEERS
909 Poydras Street, Suite 2150
New Orleans, Louisiana 70112-1034
Tel. 504-586-1725

1.	CONNECT CHWS AND CHWR PIPES TO UNIT AND ROUTE CONDENSATE TO NEAREST HUB DRAIN. COORDINATE WITH PLUMBING FOR LOCATION OF NEAREST HUB DRAIN. PROVIDE PUMP WHERE ELEVATION OF HUB DRAIN IS ABOVE DRAIN OUTLET ON THE UNIT. TYPICAL ALL HVAC UNITS.
----	---

HARD ROCK
1031 CANAL STREET
NEW ORLEANS, LOUISIANA

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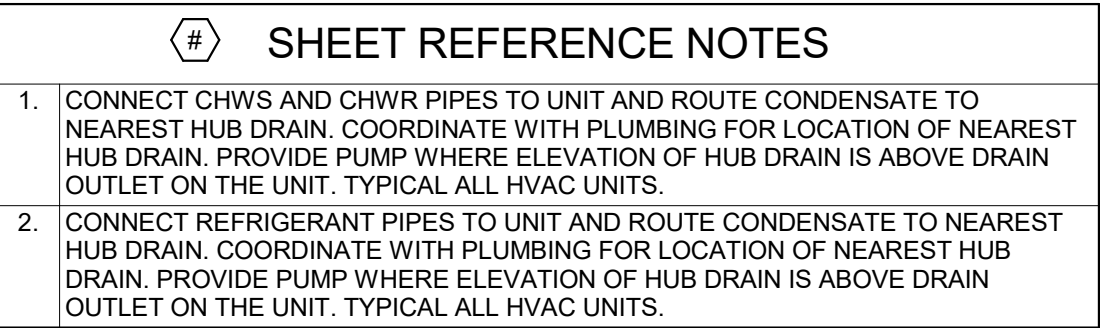


5TH FLOOR PARKING -
HVAC

M1.3.3

MOSES
ENGINEERS

SCALE: 3/32" = 1'-0"



HARD ROCK
1031 CANAL STREET
NEW ORLEANS, LOUISIANA

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STATE OF LOUISIANA
RAYMOND E. SMITH
LICENSE No. 36823
REGISTERED
IN MECHANICAL ENGINEERING

[illegible]

7TH FLOOR PARKING -
HVAC

PROJECT#: 1709

PHASE: PERMIT

TEAM: MEI

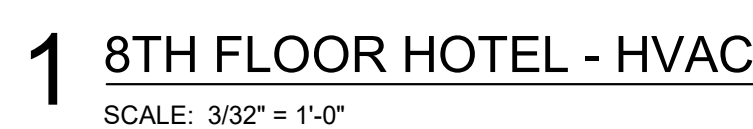
CHECKER: RS

SCALE: AS NOTED

ISSUED: 06/05/2018

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M1.3.4



MOSES
ENGINEERS

M1.4

- PROJECT#: 1709
PHASE: PERMIT
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CHECKER: RS
SCALE: AS NOTED
ISSUED: 06/05/2018



MOSES
ENGINEERS

M1.4.1

9TH FLOOR - HVAC

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SINCE 1961

SHEET REFERENCE NOTES

1. COORDINATE LOCATIONS OF DAMPERS WITH ARCHITECT. PROVIDE ACCESS PANELS FOR DAMPERS ABOVE HARD CEILINGS. WHERE ACCESS PANELS WILL INTERFERE WITH AESTHETICS OF ARCHITECTURAL CEILING, PROVIDE REMOTE DAMPER OPERATOR FOR INACCESSIBLE DAMPERS. TYPICAL ALL DAMPERS.

HARD ROCK
1031 CANAL STREET
NEW ORLEANS, LOUISIANA

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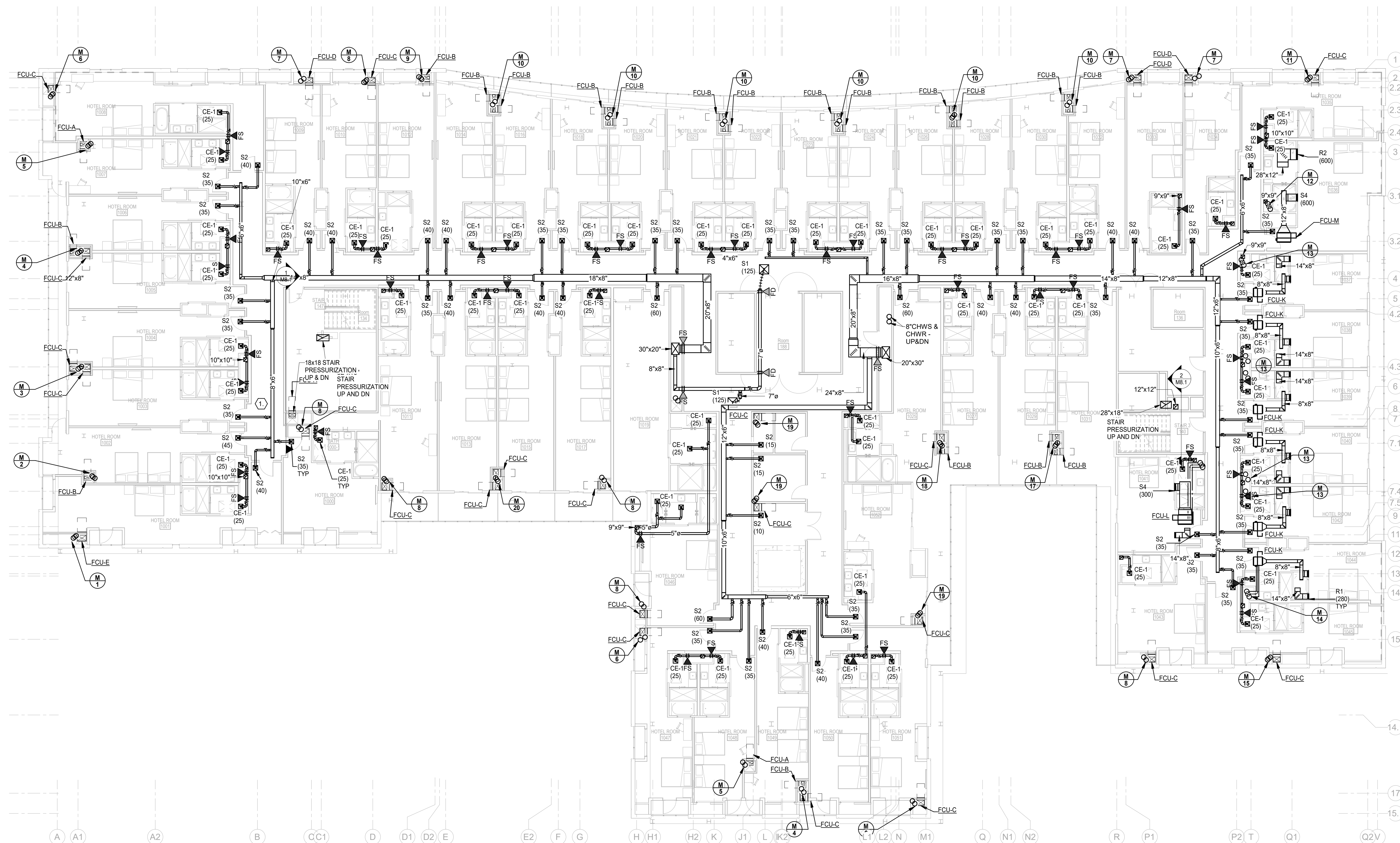
10TH - 12TH FLOORS
HVAC

PROJECT#: 1709
PHASE: PERMIT
TEAM: MEI
CHECKER: RS
SCALE: AS NOTED
ISSUED: 06/05/2018

M1.4.2

SHEET REFERENCE NOTES

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1 10TH - 12TH FLOOR HOTEL - HVAC

SCALE: 3/32" = 1'-0"

MOSES
ENGINEERS

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Tel. 504-586-1725

1. COORDINATE LOCATIONS OF DAMPERS WITH ARCHITECT. PROVIDE ACCESS PANELS FOR DAMPERS ABOVE HARD CEILINGS. WHERE ACCESS PANELS WILL INTERFERE WITH AESTHETICS OF ARCHITECTURAL CEILING, PROVIDE REMOTE DAMPER OPERATOR FOR INACCESSIBLE DAMPERS. TYPICAL ALL DAMPERS.

HARD ROCK
1031 CANAL STREET
NEW ORLEANS, LOUISIANA

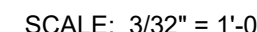
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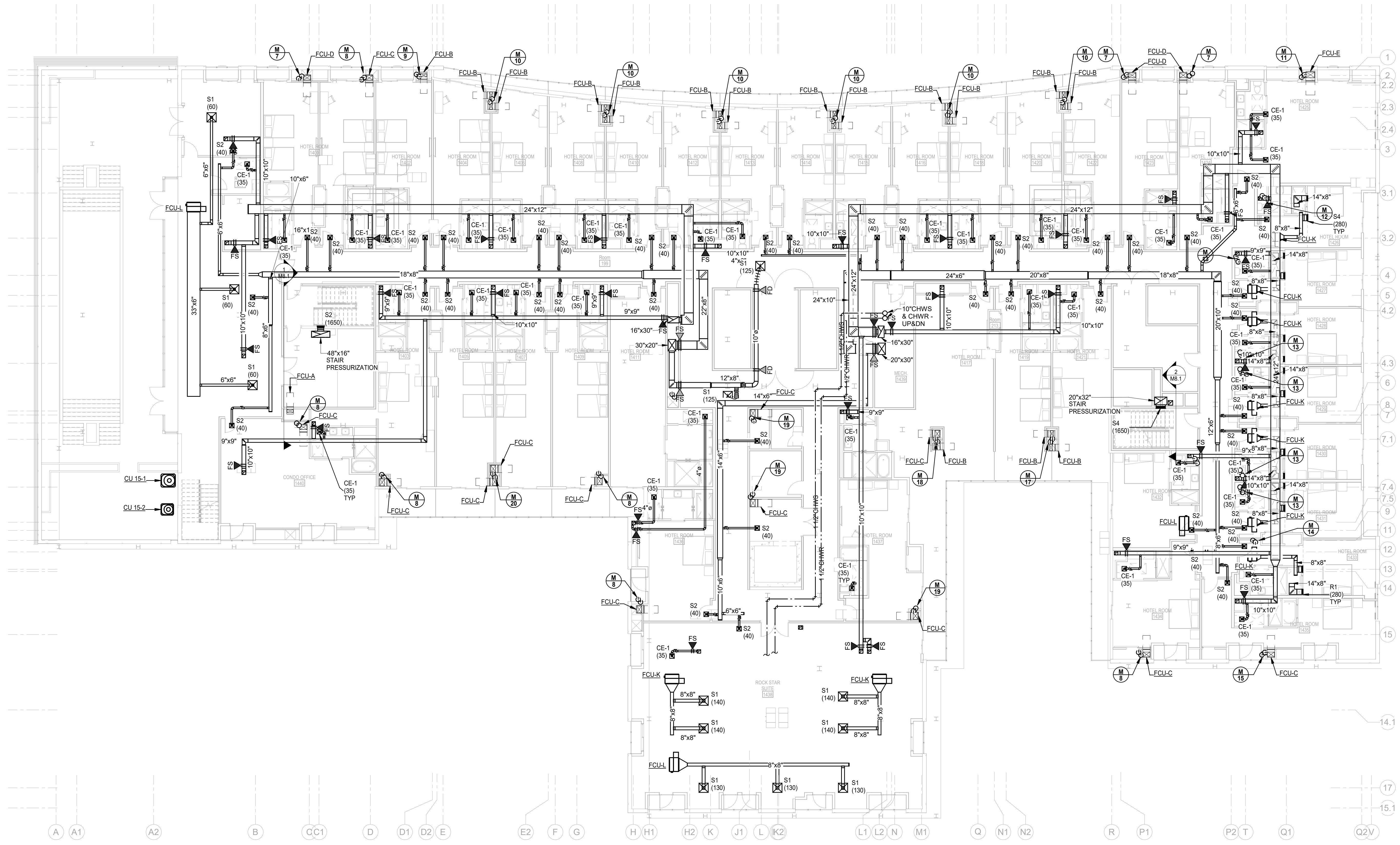
13TH FLOOR - HVAC

PROJECT#: 1709
PHASE: PERMIT
TEAM: MEI
CHECKER: RS
SCALE: AS NOTED
ISSUED: 06/05/2018

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M1.4.3





SHEET REFERENCE NOTES

1. COORDINATE LOCATIONS OF DAMPERS WITH ARCHITECT. PROVIDE ACCESS PANELS FOR DAMPERS ABOVE HARD CEILINGS. WHERE ACCESS PANELS WILL INTERFERE WITH AESTHETICS OF ARCHITECTURAL CEILING, PROVIDE REMOTE DAMPER OPERATOR FOR INACCESSIBLE DAMPERS. TYPICAL ALL DAMPERS.

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RAYMOND E. SMITH
LICENSE No. 36823
REGISTERED PROFESSIONAL ENGINEER
MECHANICAL ENGINE

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REVISION HISTORY			

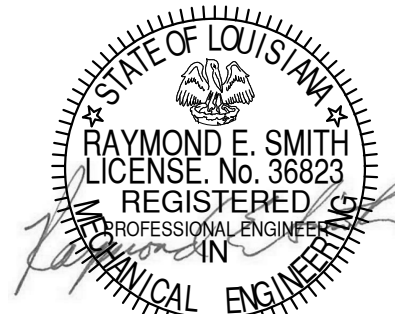
14TH FLOOR- HVAC

PROJECT#: 1709
PHASE: PERMIT
TEAM: MEI
CHECKER: RS
SCALE: AS NOTED
ISSUED: 06/05/2018

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[illegible]

15TH FLOOR - HVAC

PROJECT#: 1709
PHASE: PERMIT
TEAM: MEI
CHECKER: RS
SCALE: AS NOTED
ISSUED: 06/05/2018

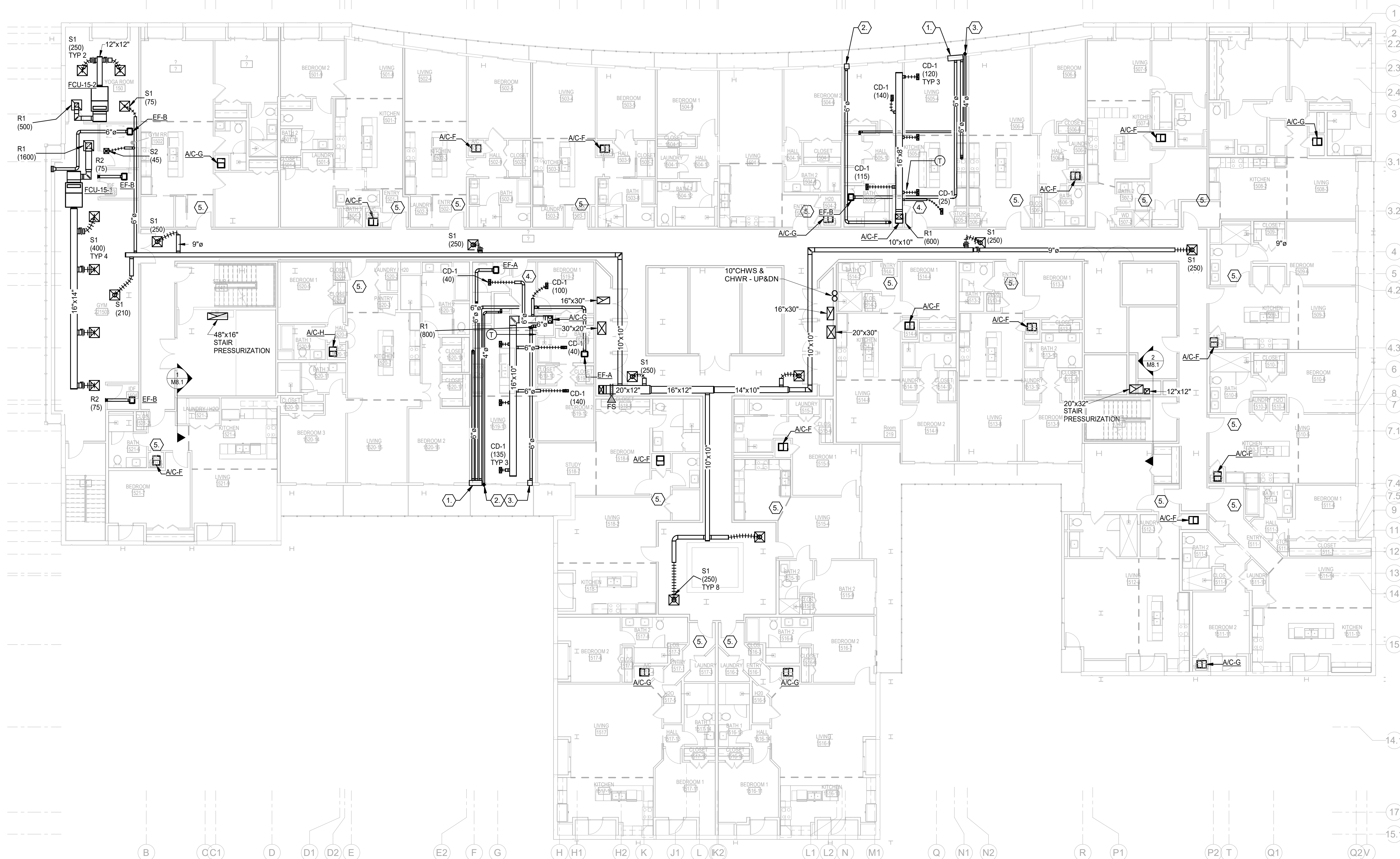
M1.4.5

SHEET REFERENCE NOTES

1. TERMINATE KITCHEN AND BATHROOM EXHAUST DUCTS AT LOUVER ON EXTERIOR WALL. PROVIDE 12" DEEP PLENUM BOX FOR CONNECTING DUCTS TO LOUVER. LOUVER SHALL BE SIZED FOR MINIMUM 1 CFM FREE AREA AND VELOCITY OF 500 FPM OR LESS WHILE DISCHARGING 500 CFM. THE OVERALL PRESSURE DROP SHALL BE NO GREATER THAN 0.08 IN. W.G. LOUVER SIZE SHALL BE AS SELECTED BY ARCHITECT (APPROXIMATELY 12"x36").
2. PROVIDE SEIHO MODEL SFZC DRYER VENT TERMINAL WITH BACKDRAFT DAMPER. MOUNT WITHIN SHEET METAL PANEL ON BUILDING EXTERIOR. COORDINATE PANEL LOCATION AND SIZE WITH THE ARCHITECT.
3. TERMINATE VENTILATION DUCTS AT LOUVER ON EXTERIOR WALL. PROVIDE 12" DEEP PLENUM BOX FOR FREE AREA AND VELOCITY OF 500 FPM OR LESS WHILE INTAKE CFM MATCHING ON LISTED ON THE SCHEDULE FOR THE CORRESPONDING UNIT. THE OVERALL PRESSURE DROP SHALL BE NO GREATER THAN 0.08 IN. W.G. LOUVER SIZE SHALL BE AS SELECTED BY ARCHITECT (APPROXIMATELY 12"x36").

SHEET REFERENCE NOTES

4. DIFFUSERS LOCATED IN CONDO UNITS SHALL HAVE BALANCING DAMPERS AT THE DIFFUSER, OPERABLE AT THE DIFFUSER FACE, TO ELIMINATE THE NEED FOR ACCESS PANELS.
5. SEE CONDO UNIT 4-20 ON THIS SHEET AND CONDO 1610 ON SHEET M1.4.4 FOR GENERAL HVAC LAYOUT OF CONDO UNITS. ALL CONDOS SHALL HAVE EXHAUST TO THE EXTERIOR WITH OUTSIDE AIR INTAKE AT THE EXTERIOR A MINIMUM 10 FEET AWAY FROM EXHAUST. SEE HVAC SCHEDULES FOR ACTUAL HVAC UNIT SIZE. SERVING EACH CONDO. PROVIDE EACH TOILET WITH AN EXHAUST FAN. PROVIDE EACH BEDROOM, FULL BATH, AND KITCHEN WITH AN EXHAUST FAN. PROVIDE LARGE CLOSETS AND LAUNDRY ROOMS SHALL ALSO HAVE SUPPLY AIR. MAKE ADJUSTMENTS TO AIRFLOW, DUCT SIZE, THERMOSTAT LOCATION, ETC. AS NECESSARY TO MEET THE SYSTEMS BASED ON DIFFERENCES IN TYPICAL CONDO VS CONDO BE CONSTRUCTED.



1 15TH FLOOR CONDOS - HVAC

SCALE: 3/32" = 1'-0"

MOSES
ENGINEERS

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Tel. 504-586-1725

1. TERMINATE KITCHEN AND BATHROOM EXHAUST DUCTS AT LOUVER ON EXTERIOR WALL. PROVIDE 12" DEEP PLENUM BOX FOR CONNECTING DUCTS TO LOUVER. LOUVER SHALL BE SIZED FOR MINIMUM 1 SF FREE AREA AND VELOCITY OF 500 FPM. MATCHING O.D. OF EXHAUST DUCT SHALL BE NO GREATER THAN 0.06 IWC. LOUVER CFM SHALL BE NO GREATER THAN 0.08 IWC. LOUVER SIZE SHALL BE AS SELECTED BY ARCHITECT (APPROXIMATELY 12"X36").
2. PROVIDE SEIHO MODEL SF2Z DRYER VENT TERMINAL WITH BACKDRAFT DAMPER. MOUNT WITHIN SHEET METAL PANEL ON BUILDING EXTERIOR. COORDINATE WITH EXISTING VENTILATION SYSTEM.
3. TERMINATE VENTILATION DUCTS AT LOUVER ON EXTERIOR WALL. PROVIDE 12" DEEP PLENUM BOX FOR CONNECTING DUCT TO LOUVER. LOUVER SHALL BE SIZED FOR MINIMUM 0.16 SF FREE AREA AND VELOCITY OF 500 FPM OR LESS WITH INTAKE CFM MATCHING OA LISTED ON THE SCHEDULE FOR THE CORRESPONDING EXHAUST FAN. LOUVER FREE AREA SHALL BE NO GREATER THAN 0.06 IWC. LOUVER CFM SHALL BE AS SELECTED BY ARCHITECT (APPROXIMATELY 12"X12").

4. DIFFUSERS LOCATED IN CONDO UNITS SHALL HAVE BALANCING DAMPERS AT THE DIFFUSER, OPERABLE AT THE DIFFUSER FACE, TO ELIMINATE THE NEED FOR ACCESS PANELS.

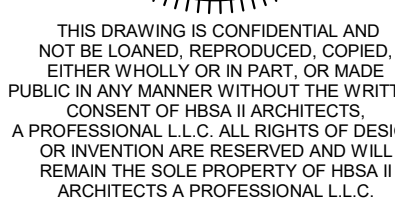
5. SECTIONS 6 AND 20 ON SHEET M1.4.3 AND CONDO 1610 ON THIS SHEET FOR GENERAL HVAC AVOUT OF CONDO UNITS. ALL CONDOS SHALL HAVE EXHAUST TO THE EXTERIOR WITH OUTSIDE AIR INTAKE AT THE EXTERIOR A MINIMUM 10 FEET AWAY FROM EXHAUST. SEE HVAC SCHEDULES FOR ACTUAL HVAC UNIT SIZE AND LOCATION. EXHAUST FROM EACH UNIT SHALL BE EXHAUSTED TO THE EXTERIOR IN EACH BEDROOM, FULL BATHROOM, AND LIVING ROOM AND KITCHEN AREAS. LARGE CLOSETS AND LAUNDRY ROOMS SHALL ALSO HAVE SUPPLY AIR. MAKE ADJUSTMENTS TO AIRFLOW, DUCT SIZE, THERMOSTAT LOCATION, ETC. AS NECESSARY TO ACHIEVE THE DESIGN SYSTEMS BASED ON DIFFERENCES IN TYPICAL CONDO UNITS TO BE CONSTRUCTED.



SCALE: 3/32" = 1'-0"

HARD ROCK
1031 CANAL STREET
NEW ORLEANS, LOUISIANA

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16TH FLOOR - HVAC

MOSES
ENGINEERS

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New Orleans, Louisiana 70112-1034
Tel. 504-586-1725

M1.4.6

HARD ROCK

1031 CANAL STREET
NEW ORLEANS, LOUISIANA

CERTIFIED CORRECT

STATE OF LOUISIANA
 ★ ★
 RAYMOND E. SMITH
 LICENSE No. 36823
 REGISTERED
 PROFESSIONAL ENGINEER
 IN
 MECHANICAL ENGINEERING

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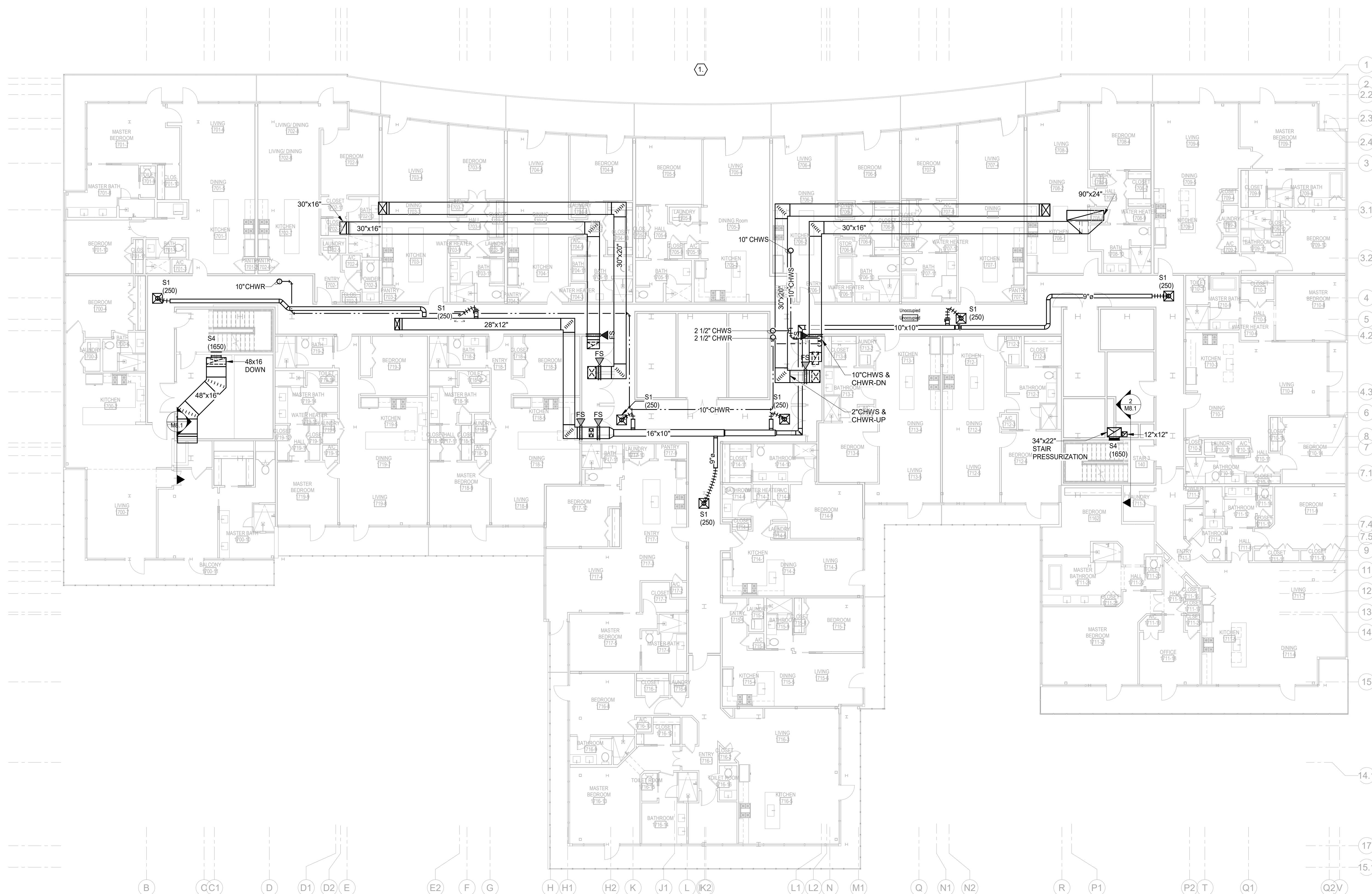
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17TH FLOOR HVAC

PROJECT#: 1709
PHASE: PERMIT
TEAM: MEI
CHECKER: RS
SCALE: AS NOTED
ISSUED: 06/05/2018

M1.4.7

1. FOR WORK INVOLVING THE BUILDING HVAC WITHIN CONDO UNITS AND SERVING COORIDOR, SEE THE 16TH FLOOR HVAC PLAN ON SHEET M1.4.6. WORK ON THIS SHEET SHOWS HVAC RELATED TO ROUTING OF MAJOR SYSTEMS FROM THE ROOF.



1 17TH FLOOR PENTHOUSE - HVAC

SCALE: 3/32" = 1'-0"

MOSES
FOURTEEN

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909 Poydras Street, Suite 2150
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Tel. 504-586-1725

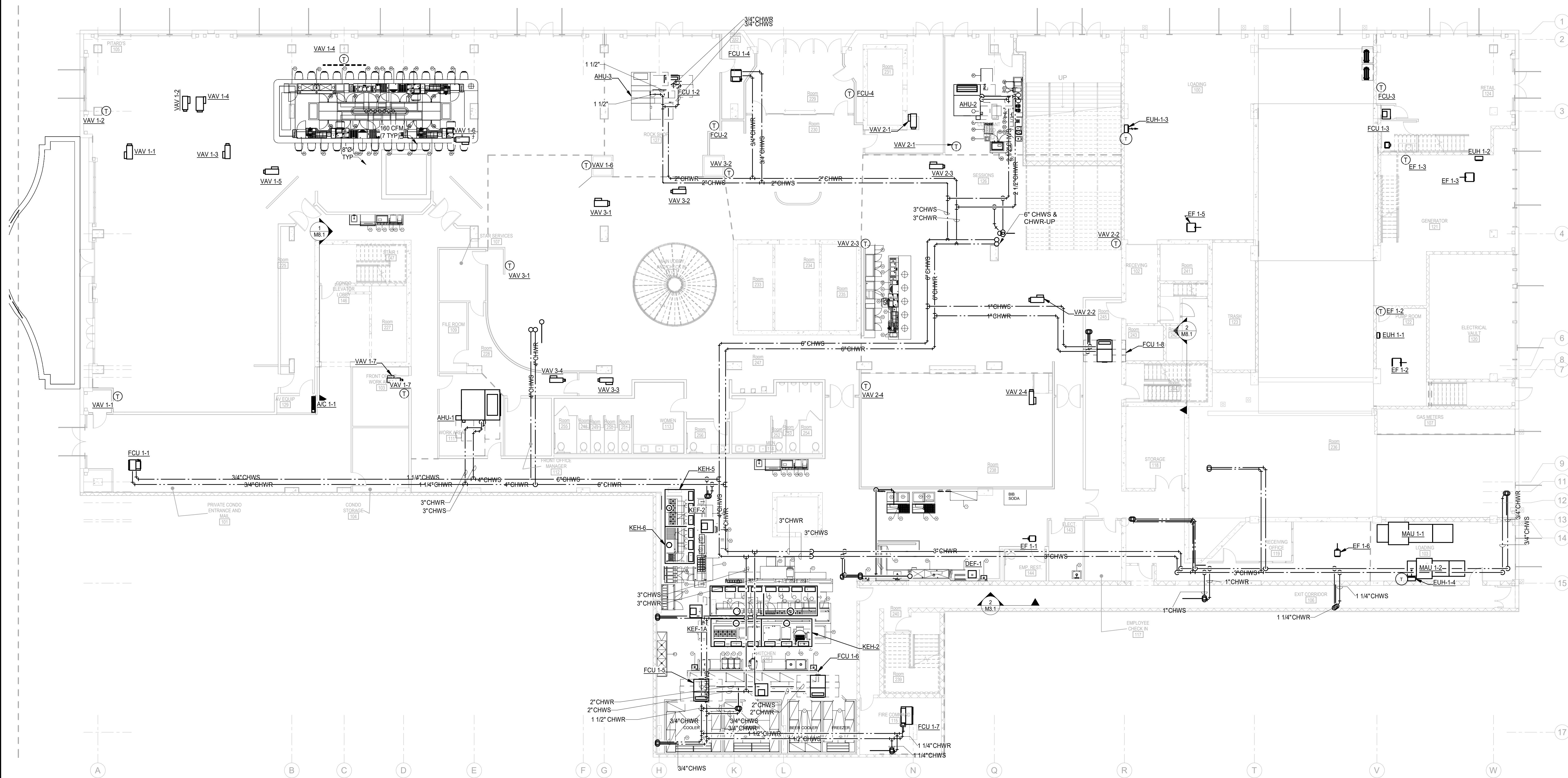
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CONSULTING ENGINEERS
909 Poydras Street, Suite 2150
New Orleans, Louisiana 70112-1034
Tel. 504-586-1725

M2.1

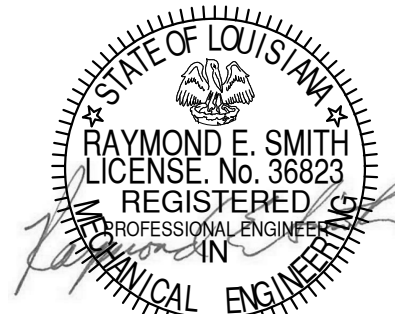


SCALE: 3/32" = 1'-0"

HARD ROCK
1031 CANAL STREET
NEW ORLEANS, LOUISIANA

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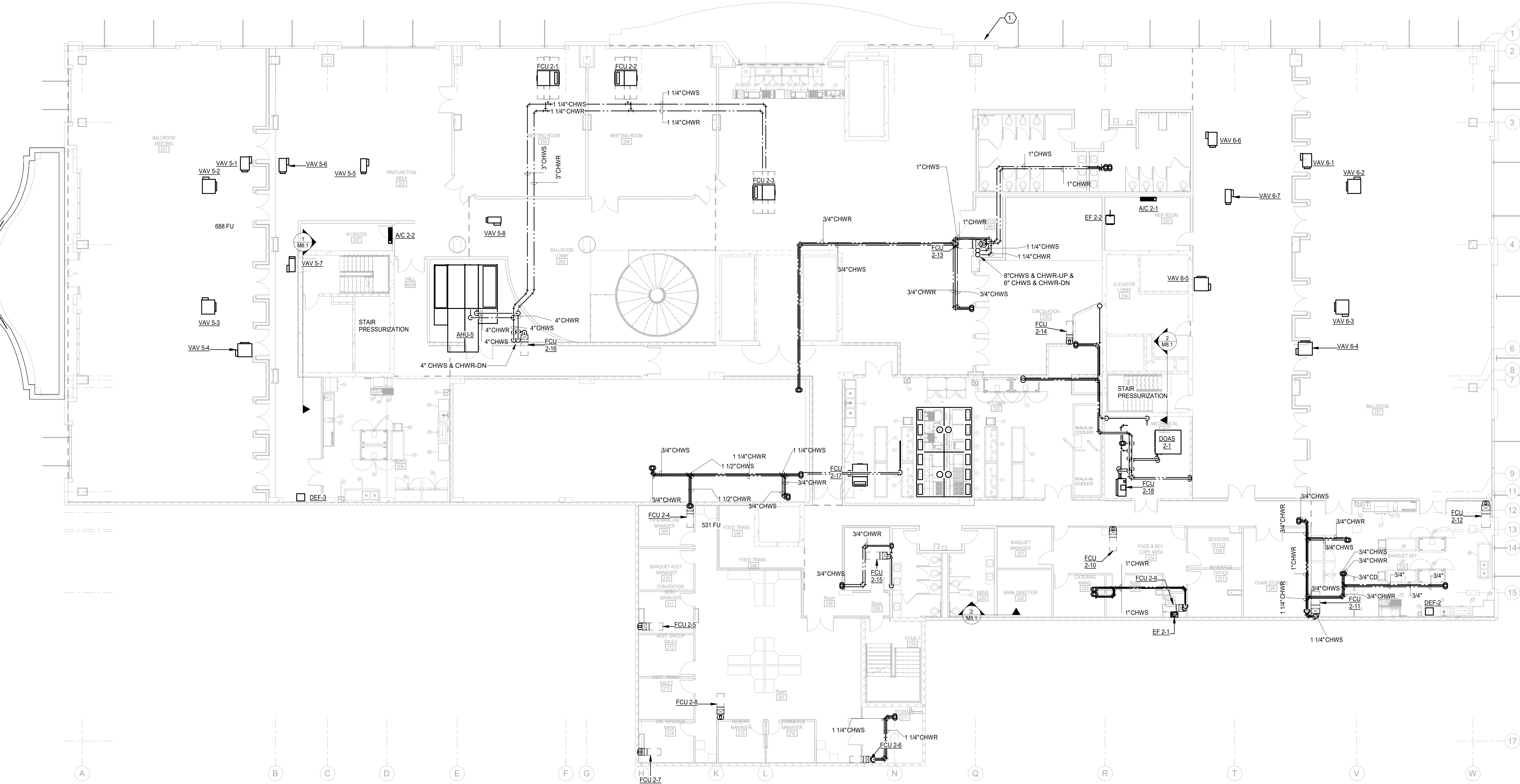
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2ND FLOOR - PIPING

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M2.2.1



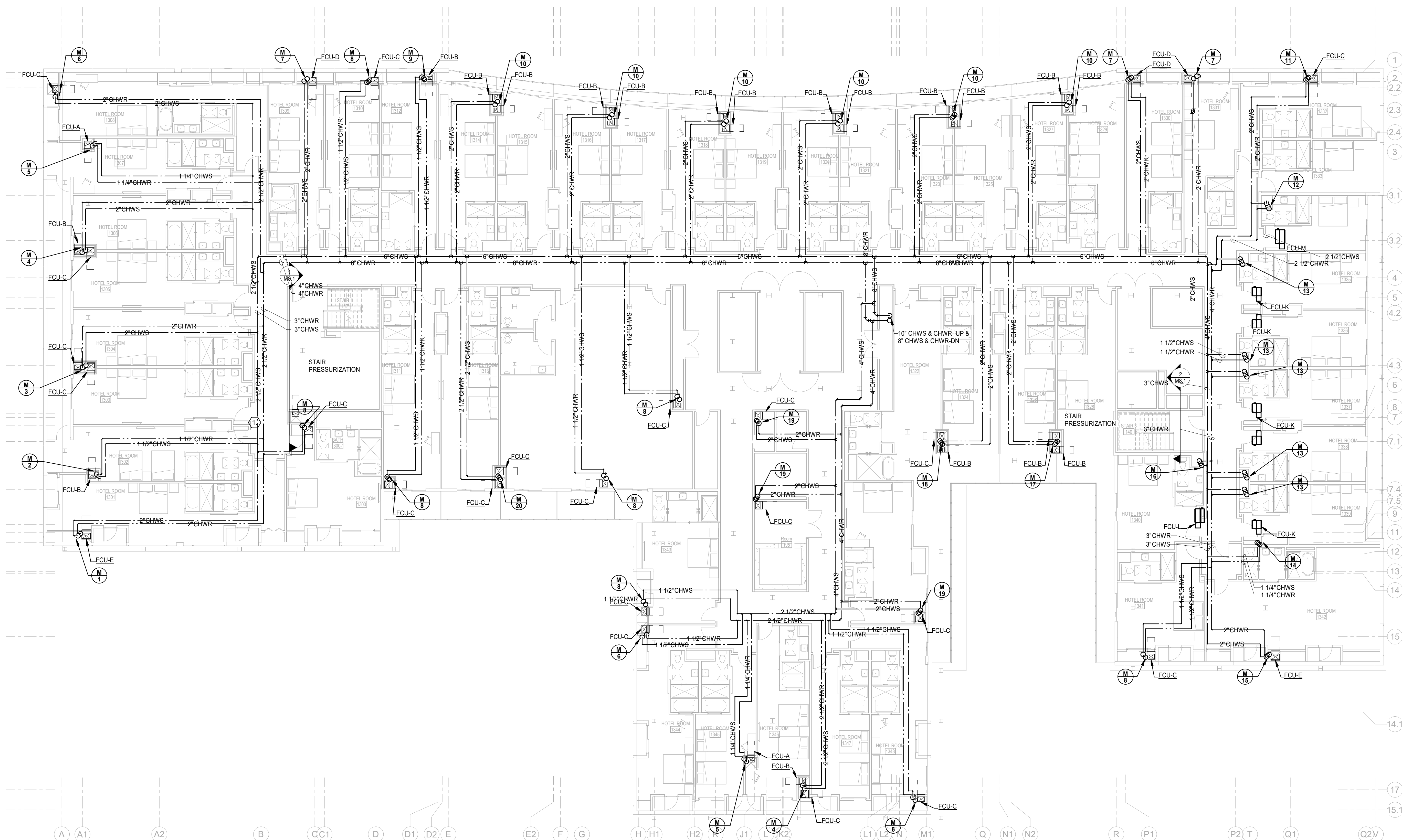
1 2ND FLOOR RETAIL - PIPING
SCALE: 3/32" = 1'-0"

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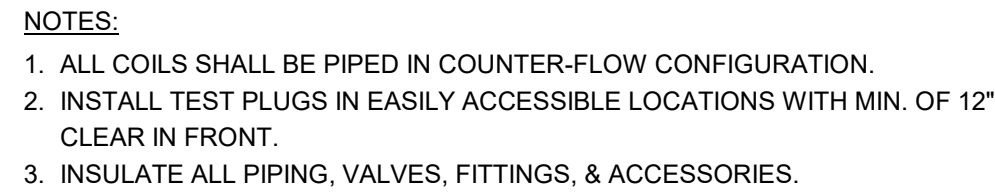
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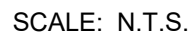
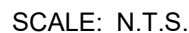
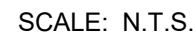
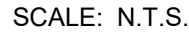
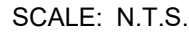
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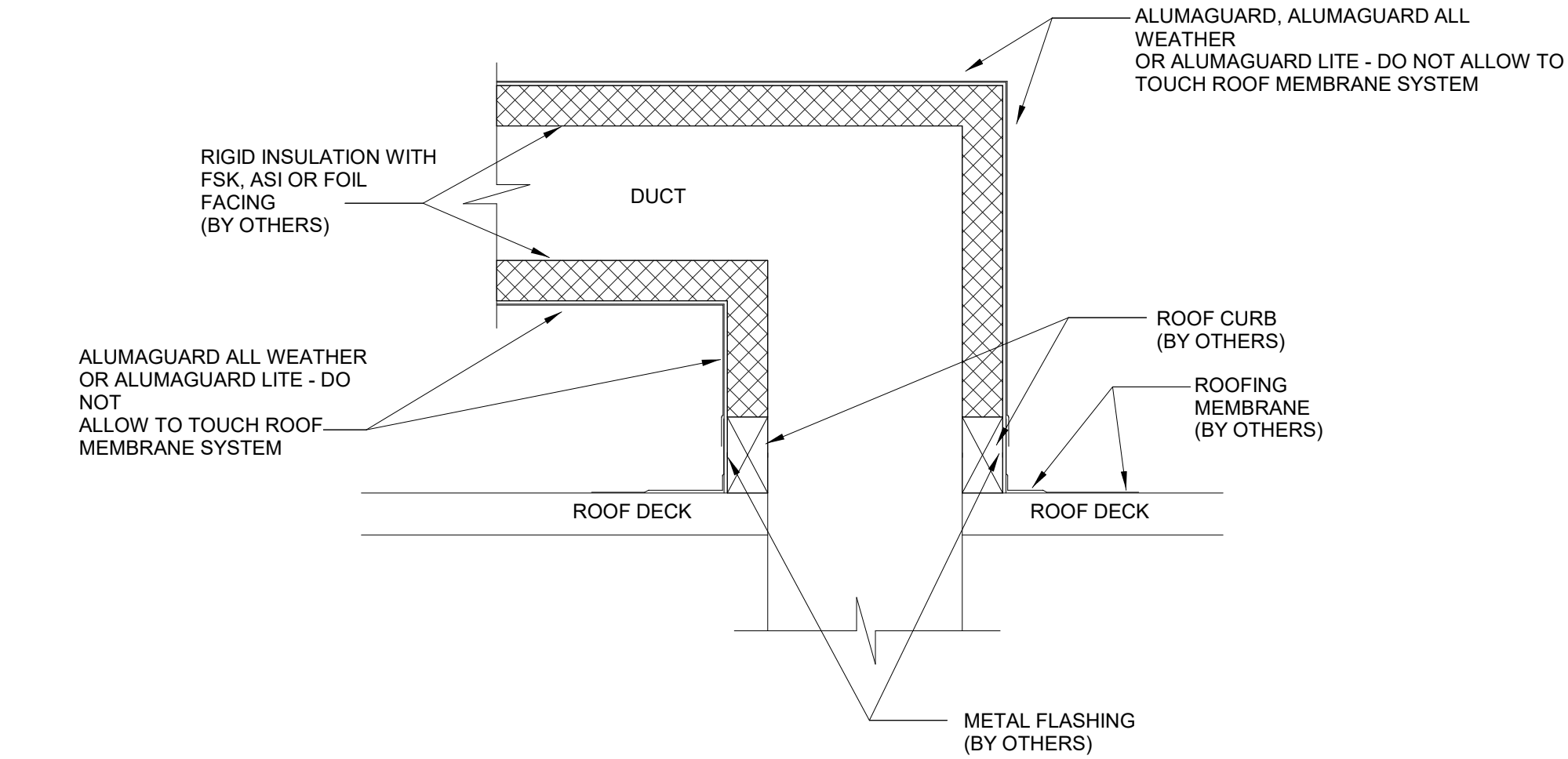
SCALE: 3/32" = 1'-0"



SCALE: N.T.S.

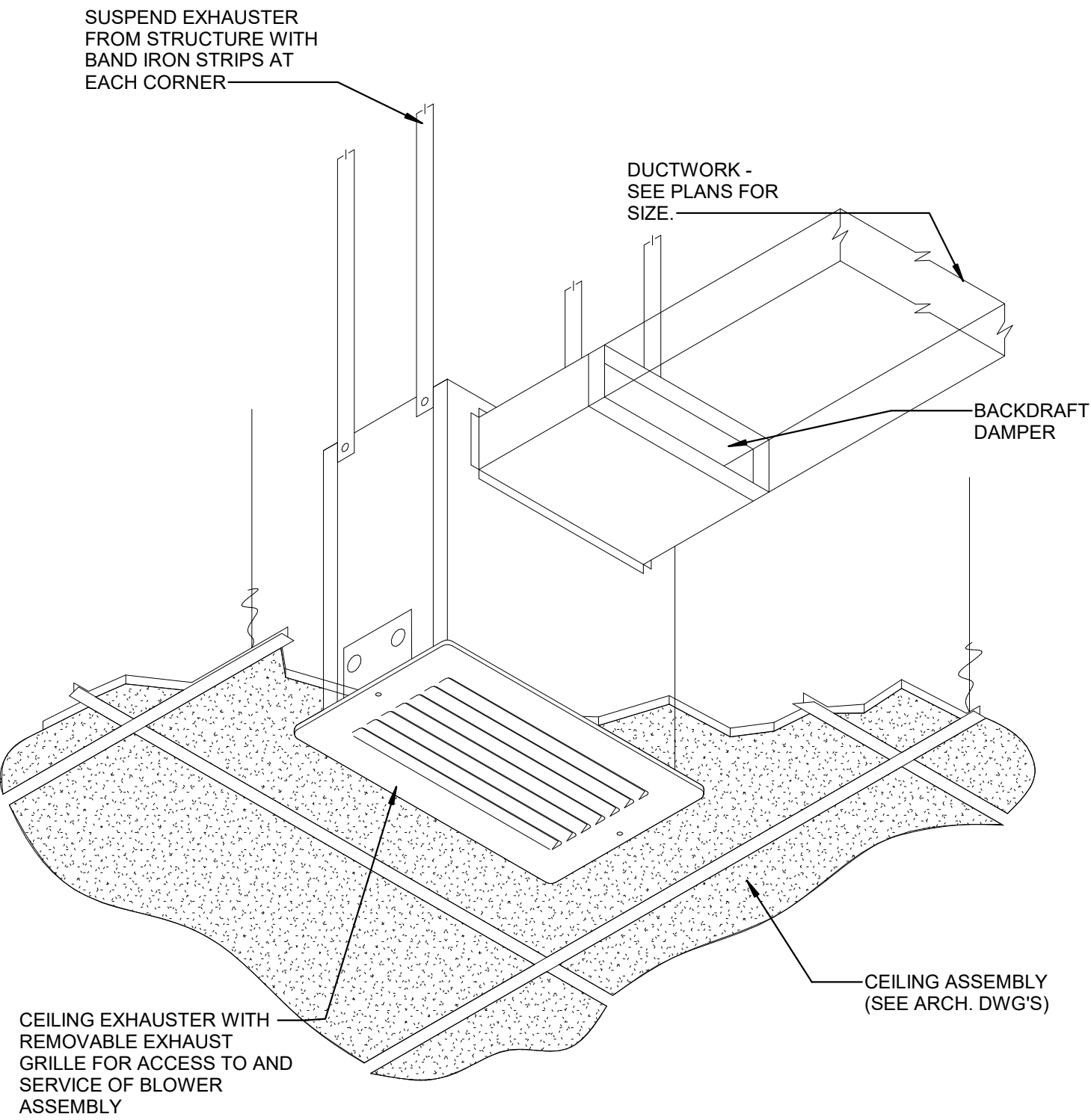


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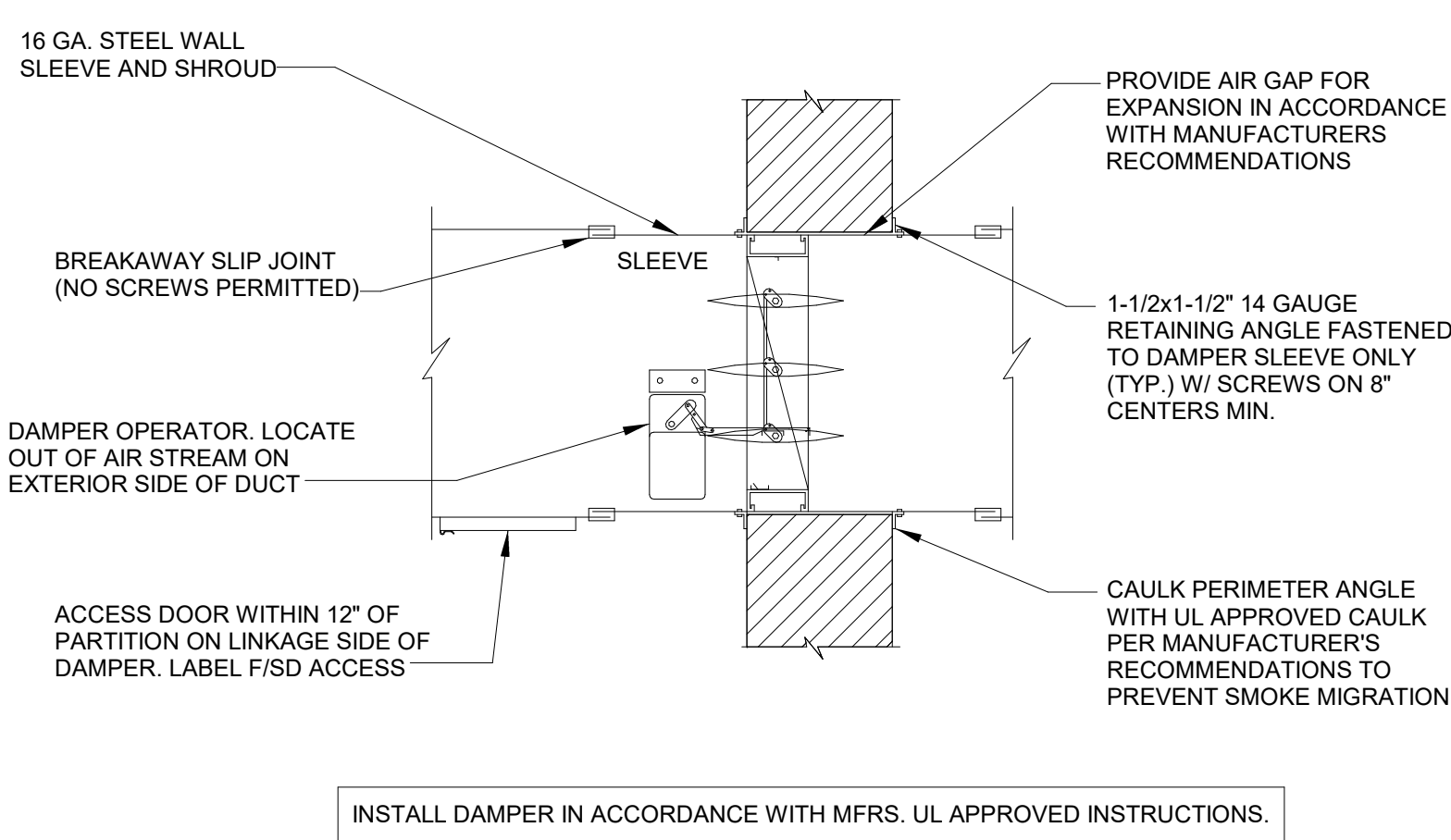
1 DUCT PENETRATION THROUGH ROOF

SCALE: N.T.S.



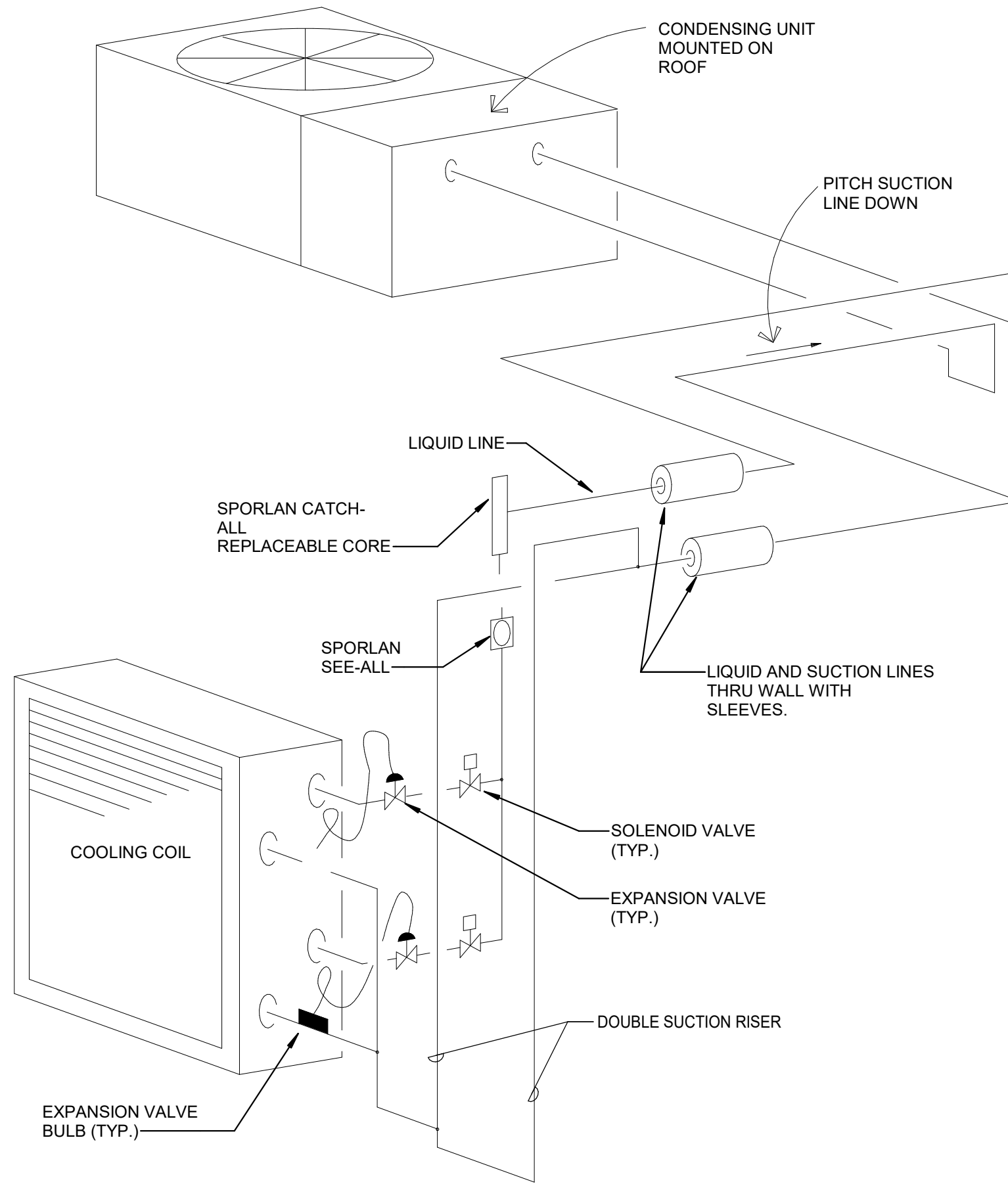
4 CEILING MOUNTED EXHAUST FAN

SCALE: N.T.S.



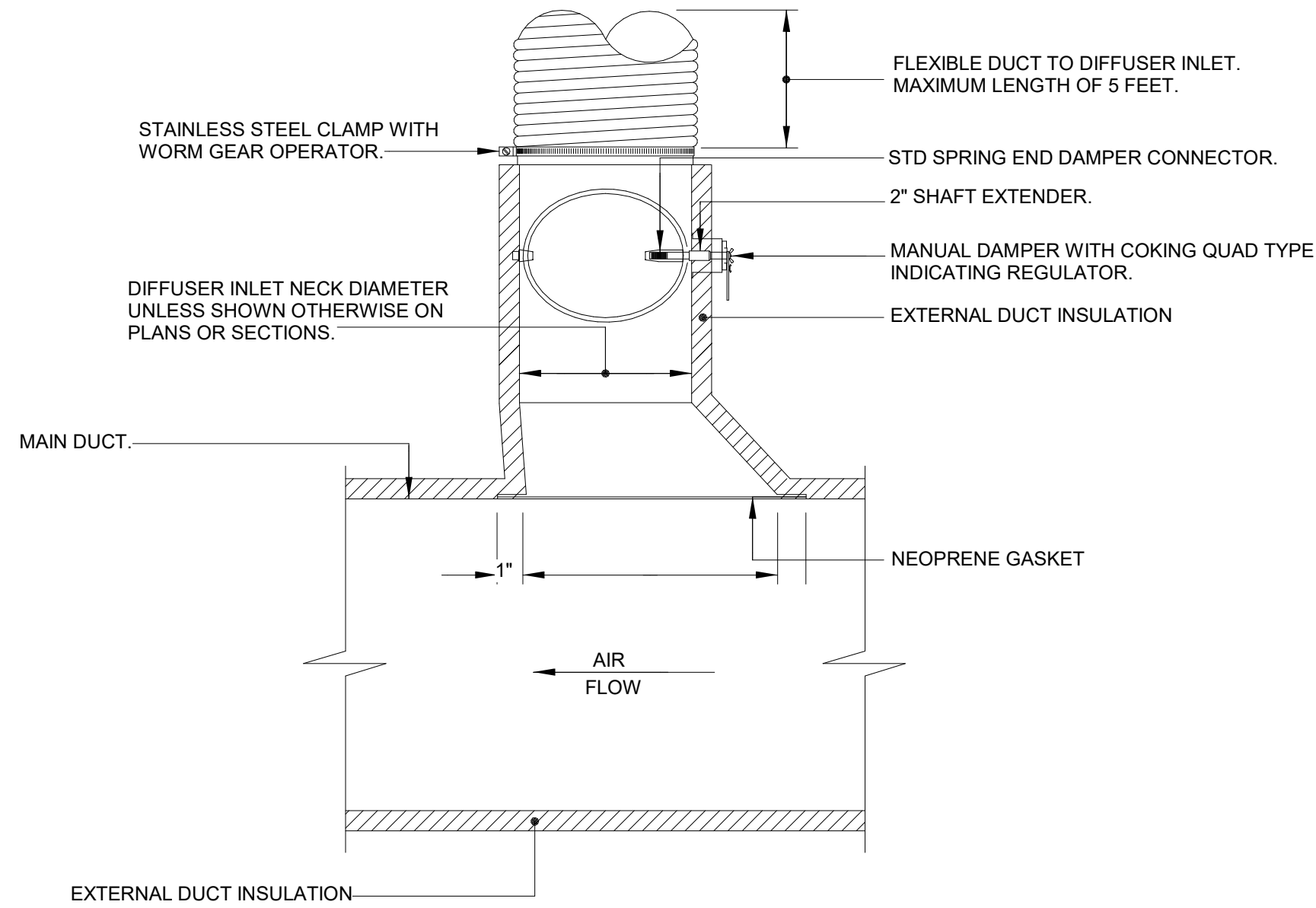
2 FIRE/SMOKE DAMPER

SCALE: N.T.S.



5 REFRIGERANT PIPING DIAGRAM

SCALE: N.T.S.

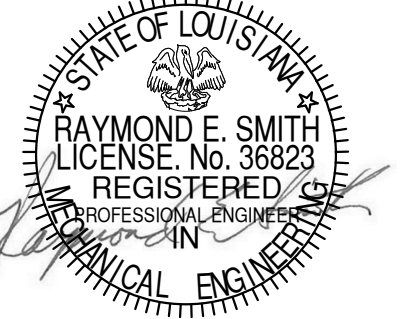


3 LOW PRESSURE DUCT TAKEOFF

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MECHANICAL DETAILS

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PHASE: PERMIT
TEAM: MEI
CHECKER: RS
SCALE: AS NOTED
ISSUED: 06/05/2018

DEDICATED OUTSIDE AIR UNITS SCHEDULE																																																
REMARKS: 1. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. 2. PROVIDE HOT GAS REHEAT TO SUPPLY NEUTRAL SUPPLY AIR. 3. MOUNT UNIT ON CURB HIGH ENOUGH TO ROUTE DUCT WITHIN THE CURB.																				ACCESSORIES: 1. VIBRATION ISOLATION ROOF CURB. 2. BACKNET COMPATIBLE DIRECT DIGITAL CONTROLS WITH INTEGRATION . 3. VARIABLE FREQUENCY DRIVE.																												
MARK	LOCATION	SUPPLY FAN DATA (EACH)				EXHAUST FAN DATA (EACH)				Dx COOLING COIL								ENTHALPY WHEEL PERFORMANCE								HOT GAS REHEAT				GAS POST HEAT				ELECTRICAL DATA								BASIS OF DESIGN				WEIGHT (lbs)	ACCESSORIES	REMARKS
		FAN QTY.	SUPPLY (CFM)	EXT SP (IWC)	MOTOR (HP)	FAN QTY.	EXHAUST (CFM)	ESP (IWC)	MOTOR (HP)	TOT (MBH)	SENS (MBH)	EAT DB (°F)	EAT WB (°F)	LAT DB (°F)	LAT WB (°F)	OUTSIDE AIR				EXHAUST AIR				CAPACITY (MBH)	MAX LAT (°F)	MIN OUTPUT (MBH)	EAT (°F)	LAT (°F)	MODULATION (%)	REFRIGERANT	PREFILTER (MERV)	FINAL FILTER (MERV)	VOLT (V)	PH (pH)	FREQ (Hz)	FLA (A)	MCA (A)	MOCP (A)	MFG	MODEL								
																SUMMER (°F)		WINTER (°F)		SUMMER (°F)		WINT R EAT																										
																EAT-D B	EAT-W B	LAT-D B	LAT-W B	EAT	LAT		EAT-D B																		EAT-W B							
																B	B	B	B																													
DOAS 18-1	ROOF	2	4300	1	3	2	2300	1	1	593.9	265.7	79.4	72.6	51.4	51.4	84.5	79.9	79.4	72.6	15	44.1	75	63.8	68	181.1	72	475.2	15	70	25-100	R-410A	8	11	460	3	60	0.0	109.7	125	VALENT	VPRE-352-50C-60I-C-1DA	9862	1., 2., 3.	1., 2.				
DOAS 18-2	ROOF	2	4300	1	3	2	2300	1	1	593.9	265.7	79.4	72.6	51.4	51.4	84.5	79.9	79.4	72.6	15	44.1	75	63.8	68	181.1	72	475.2	15	70	25-100	R-410A	8	11	460	3	60	0.0	109.7	125	VALENT	VPRE-352-50C-60I-C-1DA	9862	1., 2., 3.	1., 2., 3.				
DOAS 18-3	ROOF	2	2915	0.75	1.5					506.6	253	84.5	79.9	52.8	52.4																																	

DEDICATED OUTSIDE AIR UNITS SCHEDULE																																													
REMARKS: 1. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. 2. PROVIDE HOT GAS REHEAT TO SUPPLY NEUTRAL SUPPLY AIR. 3. MOUNT UNIT ON CURB HIGH ENOUGH TO ROUTE DUCT WITHIN THE CURB.																				ACCESSORIES: 1. VIBRATION ISOLATION ROOF CURB. 2. BACKNET COMPATIBLE DIRECT DIGITAL CONTROLS WITH INTEGRATION . 3. VARIABLE FREQUENCY DRIVE.																									
MARK	LOCATION	FAN QTY.	SUPPLY FAN DATA (EACH)				PREHEAT (SCR)				Dx COOLING COIL				HOT GAS REHEAT				ELECTRIC REHEAT				CONDENSER				ELECTRICAL DATA				BASIS OF DESIGN				WEIGHT (lbs)	ACCESSORIES	REMARKS								
			SUPPLY (CFM)	EXT SP (IWC)	MOTOR (HP)	CAP (kW)	LAT (°F)	TOT (MBH)	SENS (MBH)	EAT DB (°F)	EAT WB (°F)	LAT DB (°F)	LAT WB (°F)	CAPACITY (MBH)	MAX LAT (°F)	TYPE	MIN OUTPUT (MBH)	EAT (°F)	LAT (°F)	MODULATION (%)	TYPE	EWT (°F)	LWT (°F)	FLOW (GPM)	WPD (FT)	REFRIGERANT	PREFILTER (MERV)	FINAL FILTER (MERV)	VOLT (V)	PH (φ)	FREQ (Hz)	FLA (A)	MCA (A)	MOCP (A)				MFG	MODEL						
DOAS 2-1	2ND FLR	1	1335	0.75	1	9.5	52.4			84.5	79.9	52.4	52.4	28.3	72	SCR	25.4	52.4	70	20-100	WATER COOLED	42	56			R-410A	8	11	480	3	60	98.0	117.3	125	ABOVEAIR	AWC-240D-4-HG0-00-OA-SF-D1-D	1550	2	1., 2.						
DOAS 2.5-1	2ND FLOOR	1	2760	0.75	1	20	52.4			84.5	79.9	52.4	52.4	57.8	72	SCR	52.5	52.4	70	20-100	WATER COOLED	42	56			R-410A	8	11	480	3	60		117.3	125	ABOVEAIR	HK	1550	2	1., 2.						
DOAS 4-1	4TH FLOOR	1	1645	0.75	1	12	52.4			84.5	79.9	52.4	52.4	34.5	72	SCR	31.3	52.4	70	20-100	WATER COOLED	42	56			R-410A	8	11	480	3	60		117.3	125	ABOVEAIR	HK	1550	2	1., 2.						

AIR HANDLING UNITS SCHEDULE																																
<div>REMARKS:</div> <div>1. PROVIDE A SINGLE POINT ELECTRICAL CONNECTION. PROVIDE UNIT WITH INVERTER DUTY HIGH EFFICIENCY MOTOR.</div> <div>2. DAMPERS, ACTUATORS, AND ACCESSORIES SHALL BE FACTORY INSTALLED AND WIRED.</div> <div>3. COIL SELECTION BASED ON 8876 CFM AIRFLOW.</div> <div>4. MAXIMUM FACE VELOCITY FOR COOLING COIL SHALL BE 500 FPM.</div> <div>5. COIL SELECTION BASED ON 7745 CFM AIRFLOW.</div> <div>6. COIL SELECTION BASED ON 3800 CFM AIRFLOW.</div> <div>7. COIL SELECTION BASED ON 2755 CFM AIRFLOW.</div> <div>8. COIL SELECTION BASED ON 21700 CFM AIRFLOW.</div> <div>9. COIL SELECTION BASED ON 24640 CFM AIRFLOW.</div>																	<div>ACCESSORIES:</div> <div>1. VARIABLE FREQUENCY DRIVE WITH LINE REACTOR AND DISCONNECT.</div> <div>2. HAND-OFF-AUTO SWITCH WITH 120 VOLT CONTROL TRANSFORMER AND PILOT LIGHT.</div> <div>3. MODULATING GAS VALVE.</div> <div>4. PROVIDE ELECTRIC HEAT AS A DUCT HEATER POWERED SEPARATE FROM THE UNIT.</div>															
MARK	LOCATION	AREA SERVED	TYPE	SUPPLY AIR DATA				COOLING COIL DATA										DRIVE TYPE	PREFILTER (MERV)	FINAL FILTER (MERV)	ELECTRICAL DATA					BASIS OF DESIGN		WEIGHT (lbs)	ACCESSORIES	REMARKS		
				# OF FANS	SUPPLY AIR (CFM)	OAMIN (CFM)	EXT SP (IWC)	TOT CAP (MBH)	SENS CAP (MBH)	EAT DB (°F)	EAT WB (°F)	LAT DB (°F)	LAT WB (°F)	EWT (°F)	LWT (°F)	FLOW (GPM)	MAX PD (FT)				MOTOR (HP) EACH	VOLT (V)	PH (φ)	FREQ (Hz)	MCA (A)	MOCP (A)	MFG				MODEL	
AHU-1	1ST FLOOR MEZZANINE	RESTAURANT	HORIZONTAL DRAW-THRU	2	8600	3425	1.5	468.4	258.9	81.2	69.9	50.3	49.7	42	56	66.95	15	DIRECT	8	11	3	460	3	60	26.47	45	CARRIER	39M	2350	1, 2	1, 2, 4, 5.	
AHU-2	1ST FLOOR CEILING	SESSIONS	HORIZONTAL DRAW-THRU	1	4300	1665	1.5	228.6	125.3	80.8	69.9	50.3	49.7	42	56	32.68	15	DIRECT	8	11	3	460	3	60	13.97	20	CARRIER	39M	1450	1, 2	1, 2, 4, 6.	
AHU-3	1ST FLR ABV ROCK SHOP	LOBBY	HORIZONTAL DRAW-THRU	1	3050	1445	1.5	183.2	98	83.2	71.6	50.3	49.7	42	56	26.19	15	DIRECT	8	11	2	460	3	60	6.22	15	CARRIER	39M	900	1, 2	1, 2, 4, 7.	
AHU-4	2ND FLR MEZZ	2ND FLR	HORIZONTAL DRAW-THRU	4	27100	4250	1.5	1003.8	589.2	74.3	65.6	52.2	51.5	42	56	143.48	15	DIRECT	8	11	5	460	3	60			CARRIER	39M		1, 2	1, 2, 4, 8.	
AHU-5	2ND FLR	2ND FLR	HORIZONTAL DRAW-THRU	4	25400	3950	1.5	916.9	532.9	75	66.1	52.1	51.5	42	56	131.05	15	DIRECT	8	11	5	460	3	60			CARRIER	39M		1, 2	1, 2, 4, 9.	
AHU-6	BAR ROOF	ROOFTOP BAR	HORIZONTAL DRAW-THRU	1	9700	2665	1.5	428.1	245.7	78.7	68.4	53.1	52.4	42	56	61.18	15	DIRECT	8	11	5	460	3	60			CARRIER	39M		1, 2	1, 2, 3, 4.	

AIR COOLED CHILLER SCHEDULE																									
REMARKS: 1. PROVIDE VARIABLE SPEED COMPRESSOR(S) WITH VARIABLE SPEED/FREQUENCY DRIVES. 2. PROVIDE MFG STANDARD SOUND CONTROL OPTION.												ACCESSORIES: 1. FACTORY INSTALLED FLOW SWITCH. 2. EVAPORATOR HEATER POWERED BY SEPARATE 115V, 15A POWER SOURCE.													
MARK	NOM CAP (TON)	REFRIGERANT	# OF PASSES	EVAPORATOR PERFORMANCE					AMBIENT		EFFICIENCY			ELECTRICAL								MFG	MODEL	ACCESSORIES	REMARKS
				EWT (°F)	LWT (°F)	DESIGN FLOW (GPM)	MIN FLOW (GPM)	WPD (°F)	EAT (°F)	COP	EER	IPLV	NPLV	VOLT (V)	PH (φ)	FREQ (Hz)	MCA (A)	MOCP (A)	WEIGHT (lbs)						
CH-1	350	R-134A	2	56	42	686.66	418.8	16.7	95	3	9.5	17.18	14.5	460	3	60	686.6	1000	20672	CARRIER	30XV350	1., 2.	1., 2.		
CH-2	350	R-134A	2	56	42	686.66	418.8	16.7	95	3	9.5	14.835	14.5	460	3	60	686.6	1000	20672	CARRIER	30XV350	1., 2.	1., 2.		
CH-3	350	R-134A	2	56	42	686.66	418.8	16.7	95	3	9.5	14.835	14.5	460	3	60	686.6	1000	20672	CARRIER	30XV350	1., 2.	1., 2.		

FAN COIL UNIT SCHEDULE

- REMARKS:
1. SINGLE POINT ELECTRICAL CONNECTION. INTEGRAL DISCONNECT
 2. PROVIDE THERMAL OVERLOAD PROTECTION FOR ELECTRICAL HEATERS.
 3. PROVIDE BACNET THERMOSTAT COMPATIBLE WITH ENERGY MANAGEMENT SYSTEM.
 4. SELECT UNIT FOR MEDIUM FAN SPEED AT DESIGN AIRFLOW.
 5. PROVIDE STAND-ALONE CONTROLS WITH 24VAC T-STAT TO BE FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR.
 6. SCHEDULED ESP DOES NOT INCLUDE CABINET LOSSES, DIRTY FILTER, ELECTRIC HEAT STRIP, COOLING COIL, AND RETURN AIR GRILLE.

- ACCESSORIES:
1. 3 SPEED PSC FAN MOTOR.
 2. FUSED SERVICE SWITCH.
 3. DRAIN PAN FLOAT SWITCH.
 4. BUILT-IN CONDENSATE PUMP.
 5. 2-WAY NC VALVE WITH 24V ACTUATOR.
 6. 24VAC WALL THERMOSTAT.

MARK	LOCATION	AREA SERVED	TYPE	FAN DATA					COOLING COIL DATA										ELECTRIC HEATING DATA				BASIS OF DESIGN		ELECTRICAL DATA		ACCESSORIES	REMARKS
				SUPPLY (CFM)	OA (CFM)	EXT SP (W/C)	MOTOR (HP)	(FAN) QTY.	TOT CAP (MBH)	SENS CAP (MBH)	EAT DB (°F)	EAT WB (°F)	LAT DB (°F)	LAT WB (°F)	FLOW (GPM)	MAX PD (FT)	CAP (KW)	LAT (°F)	WEIGHT (lbs)	MFG	MODEL	VOLT (V)			PH (φ)	FREQ (Hz)		
FCU 1-1	1ST FLOOR	BOH	HORIZONTAL	900	245	0.15	0.5	1	28.8	19.6	81.5	67.7	55	53.9	4.1	4	7	85	200	CARRIER	BCHD	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 1-2	1ST FLOOR	ROCK SHOP	HORIZONTAL	930	190	0.15	0.5	1	32.1	21.8	77.8	66.5	55.9	54.9	4.6	4	5	85	285	CARRIER	BCHD	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 1-4	1ST FLOOR	ENTRY LOBBY	HORIZONTAL	700	70	0.15	0.5	1	21.2	16.3	77.7	65.1	55.8	54.7	3	4	3	85	200	CARRIER	BCHD	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 1-5	1ST FLOOR	KITCHEN	HORIZONTAL	6660	810	0.15	1	1	200.8	155.9	80.6	67.3	58.9	57.7	28.7	4	15	85	285	CARRIER	BCHD	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 1-6	1ST FLOOR	KITCHEN	HORIZONTAL	6660	810	0.15	1	1	199.2	154.3	80.5	67.3	58.9	57.7	28.5	4	14	85	285	CARRIER	BCHD	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 1-7	1ST FLOOR	FIRE CONTROL	HORIZONTAL	550	70	0.15	1	1	14.3	11.6	78.2	66.1	58.8	57.7	2.1	4	7	85	285	CARRIER	BCHD	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 1-8	1ST FLOOR	BOH	HORIZONTAL	1260	170	0.15	0.5	1	38.5	32	83.4	68.2	59.9	58.5	5.5	4	2	85	285	CARRIER	BCHD	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-1	2ND FLOOR	MEETING RM 203	HORIZONTAL	1750	300	0.15	0.5	1	64.5	42.2	76.9	66.1	54.5	53.6	9.2	4	12	85	200	CARRIER	BCHD	480	3	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-2	2ND FLOOR	MEETING RM 204	HORIZONTAL	1750	300	0.15	0.5	1	66.5	43.4	76.2	65.5	53.6	52.8	9.5	4	12	85	200	CARRIER	BCHD	480	3	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-3	2ND FLOOR	2ND FLR CORR	HORIZONTAL	4050	250	0.3	0.5	1	83.6	72.2	71.2	61.1	54.7	53.7	12	4	19	85	200	CARRIER	BCHD	480	3	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-4	2ND FLOOR	209	VERT. STACK	220		0.15	0.03	1	6	4.5	73.3	62	52	51	0.85	0.9	1	85	400	KRUEGER	KVPH 03	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5	2ND FLOOR	211	VERT. STACK	340		0.15	0.067	1	7.6	6.9	73.3	60.1	52	50.8	1.09	2.1	2	85	415	KRUEGER	KVPH 06	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-6	2ND FLOOR	211	VERT. STACK	460		0.15	0.04	1	7.8	7.1	73	60.1	52	50.8	1.12	1.5	2	85	400	KRUEGER	KVPH 04	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-7	2ND FLOOR	211	VERT. STACK	85		0.15	0.03	1	1.9	1.7	73.3	60.1	52	50.8	0.27	0.9	1	85	400	KRUEGER	KVPH 03	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-8	2ND FLOOR	211	VERT. STACK	575		0.15	0.167	1	13.6	11.9	73.3	60.5	52	50.8	1.94	3	3	85	415	KRUEGER	KVPH 08	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-9	2ND FLOOR	211	VERT. STACK	530		0.15	0.067	1	9.9	8.9	73.1	60.1	52	50.8	1.41	2.1	3	85	415	KRUEGER	KVPH 06	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-10	2ND FLOOR	211	VERT. STACK	335		0.15	0.067	1	7.8	7	73.4	60.3	52	50.8	1.12	2.1	1	85	415	KRUEGER	KVPH 06	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-11	2ND FLOOR	211	VERT. STACK	920		0.15	0.2	1	8.4	7.5	73.1	60.1	52	50.8	1.2	3.9	3	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-12	2ND FLOOR	211	VERT. STACK	920		0.15	0.2	1	8.4	7.5	73.1	60.1	52	50.8	1.2	3.9	3	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-13	2ND FLOOR	211	VERT. STACK	965		0.15	0.2	1	7.4	7.4	75.9	46.3	55	35.5	1.1	3.9	5	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-14	2ND FLOOR	211	VERT. STACK	110		0.05	0.03	1	2.4	2.4	76.7	46.7	55	35.5	0.3	0.9	0	85	400	KRUEGER	KVPH 03	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-15	2ND FLOOR	211	VERT. STACK	310		0.15	0.067	1	5.5	4.2	72.9	61.7	52	51	0.78	2.1	2	85	415	KRUEGER	KVPH 06	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-16	2ND FLOOR	211	VERT. STACK	480		0.15	0.067	1	5.1	4.8	76	62.2	55	53.7	0.7	2.1	3	85	415	KRUEGER	KVPH 06	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-17	2ND FLOOR	PREP KITCHEN	HORIZONTAL	1800		0.15	1	1	57.4	43.1	81.3	68.1	59.1	57.9	8.21	4	7	85	200	CARRIER	BCHD	480	3	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-18	2ND FLOOR	PREP KITCHEN	VERTICAL	1650		0.3	1	1	56.9	40.6	82.1	68.9	59.3	58.1	8.13	4	3	85										
FCU 2-5-1	2ND FLR MEZZ	211	VERT. STACK	865		0.15	0.5	1	17.4	14.2	73.2	62.5	55	54	2.5	3.9	4	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-2	2ND FLR MEZZ	211	VERT. STACK	1080		0.15	0.5	1	22.3	18.6	73.3	62.3	55	54	3.2	5	5	85	460	KRUEGER	KVPH 12	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-3	2ND FLR MEZZ	211	VERT. STACK	900		0.15	0.5	1	12.3	8.9	72.7	63.3	55	54.2	1.8	3.9	4	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-4	2ND FLR MEZZ	211	VERT. STACK	900		0.15	0.5	1	12.3	8.9	72.7	63.3	55	54.2	1.8	3.9	4	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-5	2ND FLR MEZZ	211	VERT. STACK	900		0.15	0.5	1	12.3	8.9	72.7	63.3	55	54.2	1.8	3.9	4	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-6	2ND FLR MEZZ	GYM	VERTICAL	3265		0.3	1	1	74.1	64.3	73.5	62	55	53.9	10.6	4	14	85		CARRIER		208	1	60				
FCU 2-5-7	2ND FLR MEZZ	211	VERT. STACK	610		0.15	0.5	1	12.9	10.1	78.9	65	55	53.8	1.9	5	3	85	460	KRUEGER	KVPH 12	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-8	2ND FLR MEZZ	211	VERT. STACK	500		0.15	0.33	1	6.7	4.8	72.7	63.4	55	54.2	1	2.1	3	85	415	KRUEGER	KVPH 06	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-9	2ND FLR MEZZ	211	VERT. STACK	920		0.15	0.5	1	16.3	12.8	73.1	62.7	55	54.1	2.3	3.9	5	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-10	2ND FLR MEZZ	211	VERT. STACK	805		0.15	0.5	1	11	8.8	72.8	62.4	55	54	1.6	3.9	4	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-11	2ND FLR MEZZ	211	VERT. STACK	870		0.15	0.5	1	15.4	12.1	73	62.7	55	54.1	2.2	3.9	4	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-12	2ND FLR MEZZ	211	VERT. STACK	770		0.15	0.5	1	13.5	10.6	73	62.7	55	54.1	1.9	3.9	4	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-13	2ND FLR MEZZ	211	VERT. STACK	655		0.15	0.5	1	14.6	12.1	73.4	62.4	55	54	2.1	3	3	85	415	KRUEGER	KVPH 08	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-14	2ND FLR MEZZ	211	VERT. STACK	935		0.15	0.5	1	14.7	11.2	72.9	62.9	55	54.1	2.1	5	5	85	460	KRUEGER	KVPH 12	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-15	2ND FLR MEZZ	211	VERT. STACK	860		0.15	0.5	1	13.3	10.7	72.9	62.4	55	54	1.9	3.9	4	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-16	2ND FLR MEZZ	211	VERT. STACK	865		0.15	0.5	1	14.5	11.2	73	62.8	55	54.1	2.1	3.9	4	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-17	2ND FLR MEZZ	211	VERT. STACK	410		0.15	0.33	1	9.3	7.9	73.4	62.2	55	54	1.3	2.1	2	85	415	KRUEGER	KVPH 06	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-18	2ND FLR MEZZ	211	VERT. STACK	525		0.15	0.33	1	7.6	6.1	72.9	62.4	55	54	1.1	2.1	3	85	415	KRUEGER	KVPH 06	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 2-5-19	2ND FLR MEZZ	211	VERT. STACK	840		0.15	0.5	1	14.1	10.9	73	62.8	55	54.1	2	3.9	4	85	460	KRUEGER	KVPH 10	277	1	60	1, 2, 3, 4.	1, 2, 3, 4, 5, 6.		
FCU 3-1	3RD FLOOR	OSBF	VERTICAL	1270		0.15																						

EXPANSION TANK SCHEDULE											
REMARKS: 1. CHARGE PRESSURE TO BE VERIFIED UPON INSTALLATION OF HVAC SYSTEM. PROVIDE SIGHT GLASS. 2. INSTALL TANK PER MANUFACRURER'S RECOMMENDATION. TANK SHALL BE ASME RATED.											
MARK	LOCATION	SYSTEM	TYPE	ACCEPT VOL (GAL)	TANK VOL (GAL)	CHARGE PRESS (PSI)	BASIS OF DESIGN		WEIGHT (lbs)	REMARKS	
							MANUFACTURER	MODEL			
ET-1	ROOF	CHILLED WATER	DIAPHRAGM	8.1	105	50	BELL AND GOSSETT	D-200V	600	1., 2.	

AIR SEPARATOR SCHEDULE										
REMARKS: 1. ROUTE DRAIN LINE TO NEAREST ROOF DRAIN. 2. INSTALL PER MFG RECOMMENDATIONS. PROVIDE BLOWDOWN VALVE, AUTOMATIC AIR VENT, AND SKIM VALVE ACCESSORIES.										
MARK	LOCATION	SYSTEM	TYPE	FLOW RATE (GPM)	PIPE CONNECTION	MAX ΔP	BASIS OF DESIGN		WEIGHT (lbs)	REMARKS
AS-1	ROOF	CHILLED WATER	COALESCING	2070.00	12"	0.50 psi	BELL AND GOSSETT	CRS-12F	2810	1., 2.

LINEAR DIFFUSERS AND GRILLES SCHEDULE																	
REMARKS: 1. PROVIDE ACCESS PANEL AT MANUAL VOLUME DAMPER FOR DIFFUSERS MOUNTED IN GYPSUM BOARD CEILINGS WHERE BRANCH DUCT SERVING THE DIFFUSER IS ALSO ABOVE INACCESSIBLE CEILING. 2. COORDINATE DIFFUSER LOCATION WITH ARCHITECTURAL REFLECTED CEILING PLANS AND WALL ELEVATIONS. COORDINATE COLOR SELECTION WITH ARCHITECT AND SUBMIT FOR APPROVAL. 3. FURNISH AND INSTALL BRANCH DUCT TO MATCH NECK SIZE UNLESS OTHERWISE NOTED ON PLANS. 4. BORDER TYPE TO MATCH CEILING/WALL CONSTRUCTION. COORDINATE WITH ARCHITECTURAL CEILING/WALL PLAN. 5. 6.												ACCESSORIES: 1. OPPOSED BLADE DAMPER (UNLESS IN BRANCH DUCT). 2. ENGINEERED SLOT PLENUM 3. 4. 5. 6. 7. 8.					
MARK	SERVICE	LOCATION	TYPE	AIRFLOW RANGE		NECK SIZE (INCH)			DIFFUSER SIZE (INCH)		# OF SLOTS/BAR S	SLOT/BAR SPACING (INCH)	MAX .NC	BASIS OF DESIGN		ACCESSORIES	REMARKS
				MIN. (CFM)	MAX. (CFM)	DIA. (ø)	L	W	LENGTH (INCH)	WIDTH				MFG.	MODEL		
L1	SUPPLY	CEILING	LINEAR SLOT	0	60	5	-	-	12	-	2	1	30	PRICE	SDS100	1.	1, 2, 3, 4.
L1	SUPPLY	CEILING	LINEAR SLOT	61	120	6	-	-	24	-	2	1	30	PRICE	SDS100	1, 2.	1, 2, 3, 4.
L1	SUPPLY	CEILING	LINEAR SLOT	121	180	6	-	-	36	-	2	1	30	PRICE	SDS100	1, 2.	1, 2, 3, 4.
L1	SUPPLY	CEILING	LINEAR SLOT	181	240	7	-	-	48	-	2	1	30	PRICE	SDS100	1, 2.	1, 2, 3, 4.
L1	SUPPLY	CEILING	LINEAR SLOT	241	300	8	-	-	60	-	2	1	30	PRICE	SDS100	1, 2.	1, 2, 3, 4.
L2	SUPPLY	SIDEWALL	LINEAR BAR GRILLE	0	75	-	4	6	4	6	10	1/2	30	PRICE	LBP 16B	1.	1, 2, 3, 4.
L2	SUPPLY	SIDEWALL	LINEAR BAR GRILLE	76	110	-	6	6	6	6	10	1/2	30	PRICE	LBP 16B	1.	1, 2, 3, 4.
L2	SUPPLY	SIDEWALL	LINEAR BAR GRILLE	111	180	-	10	6	10	6	10	1/2	30	PRICE	LBP 16B	1.	1, 2, 3, 4.
L2	SUPPLY	SIDEWALL	LINEAR BAR GRILLE	181	290	-	16	6	16	6	10	1/2	30	PRICE	LBP 16B	1.	1, 2, 3, 4.
L2	SUPPLY	SIDEWALL	LINEAR BAR GRILLE	291	505	-	28	6	28	6	10	1/2	30	PRICE	LBP 16B	1.	1, 2, 3, 4.
L3	RETURN/EXHAUST	CEILING	LINEAR SLOT	0	90	6	-	-	12	-	2	1	30	PRICE	SDR100		2, 3, 4.
L3	RETURN/EXHAUST	CEILING	LINEAR SLOT	91	180	8	-	-	24	-	2	1	30	PRICE	SDR100	2.	2, 3, 4.
L3	RETURN/EXHAUST	CEILING	LINEAR SLOT	181	270	9	-	-	36	-	2	1	30	PRICE	SDR100	2.	2, 3, 4.
L3	RETURN/EXHAUST	CEILING	LINEAR SLOT	271	360	10	-	-	48	-	2	1	30	PRICE	SDR100	2.	2, 3, 4.
L3	RETURN/EXHAUST	CEILING	LINEAR SLOT	361	450	12	-	-	60	-	2	1	30	PRICE	SDR100	2.	2, 3, 4.
L4	RETURN/EXHAUST	SIDEWALL	LINEAR BAR GRILLE	0	75	-	4	6	4	6	10	1/2	30	PRICE	LBP 15B		2, 3, 4.
L4	RETURN/EXHAUST	SIDEWALL	LINEAR BAR GRILLE	76	110	-	6	6	6	6	10	1/2	30	PRICE	LBP 15B		2, 3, 4.
L4	RETURN/EXHAUST	SIDEWALL	LINEAR BAR GRILLE	111	180	-	10	6	10	6	10	1/2	30	PRICE	LBP 15B		2, 3, 4.
L4	RETURN/EXHAUST	SIDEWALL	LINEAR BAR GRILLE	181	290	-	16	6	16	6	10	1/2	30	PRICE	LBP 15B		2, 3, 4.
L4	RETURN/EXHAUST	SIDEWALL	LINEAR BAR GRILLE	291	505	-	28	6	28	6	10	1/2	30	PRICE	LBP 15B		2, 3, 4.
L5	SUPPLY	CEILING	LINEAR SLOT	720	960	12	-	-	72	-	5	1	30	PRICE	SDS100	1, 2.	1, 2, 3, 4.
L6	SUPPLY	CEILING	LINEAR SLOT	420	719	12	-	-	72	-	3	1	30	PRICE	SDS100	1, 2.	1, 2, 3, 4.
S3	SUPPLY	CEILING	CURVED VANE	0	75	-	6	4	L+1-3/4	W+1-3/4	-	-	30	PRICE	CVD	1.	1, 2, 3, 4, 5, 6.
S3	SUPPLY	CEILING	CURVED VANE	76	140	-	6	6	L+1-3/4	W+1-3/4	-	-	30	PRICE	CVD	1.	1, 2, 3, 4, 5, 6.
S3	SUPPLY	CEILING	CURVED VANE	141	225	-	10	8	L+1-3/4	W+1-3/4	-	-	30	PRICE	CVD	1.	1, 2, 3, 4, 5, 6.
S3	SUPPLY	CEILING	CURVED VANE	226	325	-	12	10	L+1-3/4	W+1-3/4	-	-	30	PRICE	CVD	1.	1, 2, 3, 4, 5, 6.
S3	SUPPLY	CEILING	CURVED VANE	326	445	-	14	12	L+1-3/4	W+1-3/4	-	-	30	PRICE	CVD	1.	1, 2, 3, 4, 5, 6.
S4	SUPPLY	SIDEWALL	LOUVERED	0	105	-	6	5	L+1-3/4	W+1-3/4	30	3/4	30	PRICE	22	1.	2, 3, 4, 6.
S4	SUPPLY	SIDEWALL	LOUVERED	106	255	-	10	6	L+1-3/4	W+1-3/4	30	3/4	30	PRICE	22	1.	2, 3, 4, 6.
S4	SUPPLY	SIDEWALL	LOUVERED	256	650	-	14	10	L+1-3/4	W+1-3/4	30	3/4	30	PRICE	22	1.	2, 3, 4, 6.
S4	SUPPLY	SIDEWALL	LOUVERED	651	1500	-	20	16	L+1-3/4	W+1-3/4	30	3/4	30	PRICE	22	1.	2, 3, 4, 6.
S4	SUPPLY	SIDEWALL	LOUVERED	1501	2980	-	30	24	L+1-3/4	W+1-3/4	30	3/4	30	PRICE	22	1.	2, 3, 4, 6.

MECHANICAL PUMPS														
REMARKS: 1. PROVIDE VARIABLE FREQUENCY DRIVE. 2. MOUNT ON VIBRATION ISOLATION PUMP BASE. 3. PUMPS SHALL BE PIPED IN REVERSE RETURN CONFIGURATION.							ACCESSORIES: 1. SUCTION DIFFUSER 2. TRIPLE DUTY VALVE 3. FLEXIBLE PIPE CONNECTIONS							
							ELECTRICAL DATA				BASIS OF DESIGN			WEIGHT (LBS)
MARK	SYSTEM	LOCATION	TYPE	FLOW (GPM)	HEAD (FT)	SYSTEM PRESSURE (PSI)	MOTOR (HP)	MOTOR (RPM)	VOLT (V)	PH (ø)	FREQ (Hz)	MANUFACTURER	MODEL	
CHWP-A	CHILLED WATER	ROOF	BASE MOUNTED END-SUCTION	690	100	100	25		460	3	60	BELL AND GOSSETT	E-1510 4EB	1., 2., 3.
														1., 2., 3.

ELECTRIC UNIT HEATER SCHEDULE											
REMARKS: 1. PROVIDE LINE VOLTAGE THERMOSTAT. 2. HANG UNIT ON BRACKET. COMPLY WITH MFG. CLEARANCE...							ACCESSORIES: 1. OSHA FAN GUARD. 2. LOUVER DIFFUSER. 3. WALL MOUNTED ROOM THERMOSTAT. 4. WALL MOUNTED DISCONNECT SWITCH. 5. SURFACE MOUNTING KIT.				
MARK	CAPACITY (kW)	NO. OF STAGES	LAT (°F)	VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	BASIS OF DESIGN		WEIGHT (LBS)	ACCESSORIES	REMARKS
							MANUFACTURER	MODEL			
EUH-1-1	2	1	85	208	1	60	TRANE	UHWA	41	4., 5.	1.
EUH-1-2	2	1	85	208	1	60	TRANE	UHWA	41	4., 5.	1.
EUH-1-3	2	1	85	208	1	60	TRANE	UHWA	41	4., 5.	1.
EUH-1-4	2	1	85	208	1	60	TRANE	UHWA	41	4., 5.	1.

DIFFUSER, REGISTERS, AND GRILLES SCHEDULE																	
REMARKS:												ACCESSORIES:					
1. PROVIDE ACCESS PANEL AT MANUAL VOLUME DAMPER FOR DIFFUSERS MOUNTED IN GYPSUM BOARD CEILINGS WHERE BRANCH DUCT SERVING THE DIFFUSER IS ALSO ABOVE INACCESSIBLE CEILING.												1. OPPOSED BLADE DAMPER (UNLESS IN BRANCH DUCT).					
2. ALL DIFFUSERS IN THE SAME ROOM OR SPACE SHALL HAVE THE SAME FACE/MODULE SIZE USING THE LARGEST SIZE OF THE SCHEDULED DIFFUSERS IN THAT SPACE.												2. EQUALIZING GRID.					
3. FURNISH AND INSTALL BRANCH DUCT TO MATCH NECK SIZE UNLESS OTHERWISE NOTED ON PLANS.												3. SECTORIZING BAFFLE (LESS THAN 4-WAY BLOW).					
4. FRAME TYPE TO MATCH CEILING/WALL CONSTRUCTION. COORDINATE WITH ARCHITECTURAL CEILING/WALL PLAN.												4. ROUND NECK ADAPTOR.					
5. 4-WAY THROW PATTERN UNLESS OTHERWISE NOTED ON PLANS.												5. 24"x24" MOUNTING FRAME.					
6. COORDINATE DIFFUSER LOCATION WITH ARCHITECTURAL REFLECTED CEILING PLANS AND WALL ELEVATIONS.												6. 12"x12" MOUNTING FRAME.					
												7.					
												8.					
MARK	SERVICE	LOCATION	TYPE	AIRFLOW RANGE		NECK SIZE (INCH)			FACE SIZE (INCH)		DEFLECTION (°)	BLADE SPACING (INCH)	MAX . NC	BASIS OF DESIGN		ACCESSORIES	REMARKS
				MIN (CFM)	MAX (CFM)	DIA. (ø)	L	W	LENGTH	WIDTH				MFG.	MODEL		
S1	SUPPLY	CEILING	PLAQUE	0	95	6	-	-	24	24	-	-	30	PRICE	ASPD	3.	1., 3., 4., 5., 6.
S1	SUPPLY	CEILING	PLAQUE	96	205	8	-	-	24	24	-	-	30	PRICE	ASPD	3.	1., 3., 4., 5., 6.
S1	SUPPLY	CEILING	PLAQUE	206	375	10	-	-	24	24	-	-	30	PRICE	ASPD	3.	1., 3., 4., 5., 6.
S1	SUPPLY	CEILING	PLAQUE	376	605	12	-	-	24	24	-	-	30	PRICE	ASPD	3.	1., 3., 4., 5., 6.
S1	SUPPLY	CEILING	PLAQUE	606	855	14	-	-	24	24	-	-	30	PRICE	ASPD	3.	1., 3., 4., 5., 6.
S1	SUPPLY	CEILING	PLAQUE	851	980	15	-	-	24	24	-	-	30	PRICE	ASPD	3.	1., 3., 4., 5., 6.
S2	SUPPLY	CEILING	PLAQUE	0	35	4	-	-	12	12	-	-	30	PRICE	ASPD	3.	1., 3., 4., 5., 6.
S2	SUPPLY	CEILING	PLAQUE	36	60	5	-	-	12	12	-	-	30	PRICE	ASPD	3.	1., 3., 4., 5., 6.
S2	SUPPLY	CEILING	PLAQUE	61	95	6	-	-	12	12	-	-	30	PRICE	ASPD	3.	1., 3., 4., 5., 6.
S2	SUPPLY	CEILING	PLAQUE	96	145	7	-	-	12	12	-	-	30	PRICE	ASPD	3.	1., 3., 4., 5., 6.
S2	SUPPLY	CEILING	PLAQUE	146	205	8	-	-	12	12	-	-	30	PRICE	ASPD	3.	1., 3., 4., 5., 6.
S3	SUPPLY	CEILING	CURVED VANE	0	75	-	6	4	L+1-3/4	W+1-3/4	-	-	30	PRICE	CVD	1.	1., 2., 3., 4., 5., 6.
S3	SUPPLY	CEILING	CURVED VANE	76	140	-	8	6	L+1-3/4	W+1-3/4	-	-	30	PRICE	CVD	1.	1., 2., 3., 4., 5., 6.
S3	SUPPLY	CEILING	CURVED VANE	141	225	-	10	8	L+1-3/4	W+1-3/4	-	-	30	PRICE	CVD	1.	1., 2., 3., 4., 5., 6.
S3	SUPPLY	CEILING	CURVED VANE	226	325	-	12	10	L+1-3/4	W+1-3/4	-	-	30	PRICE	CVD	1.	1., 2., 3., 4., 5., 6.
S3	SUPPLY	CEILING	CURVED VANE	326	445	-	14	12	L+1-3/4	W+1-3/4	-	-	30	PRICE	CVD	1.	1., 2., 3., 4., 5., 6.
S4	SUPPLY	SIDEWALL	LOUVERED	0	105	-	6	5	L+1-3/4	W+1-3/4	30	3/4	30	PRICE	22	1.	2., 3., 4., 6.
S4	SUPPLY	SIDEWALL	LOUVERED	106	255	-	10	6	L+1-3/4	W+1-3/4	30	3/4	30	PRICE	22	1.	2., 3., 4., 6.
S4	SUPPLY	SIDEWALL	LOUVERED	256	650	-	14	10	L+1-3/4	W+1-3/4	30	3/4	30	PRICE	22	1.	2., 3., 4., 6.
S4	SUPPLY	SIDEWALL	LOUVERED	651	1500	-	20	16	L+1-3/4	W+1-3/4	30	3/4	30	PRICE	22	1.	2., 3., 4., 6.
S4	SUPPLY	SIDEWALL	LOUVERED	1501	2980	-	30	24	L+1-3/4	W+1-3/4	30	3/4	30	PRICE	22	1.	2., 3., 4., 6.
R1	RETURN/EXHAUST	CEILING	EGGGRATE	0	130	-	6	6	12	12	-	-	30	PRICE	80		2., 3., 4., 6.
R1	RETURN/EXHAUST	CEILING	EGGGRATE	131	280	-	8	8	12	12	-	-	30	PRICE	80		2., 3., 4., 6.
R1	RETURN/EXHAUST	CEILING	EGGGRATE	281	1020	-	12	12	24	24	-	-	30	PRICE	80		2., 3., 4., 6.
R1	RETURN/EXHAUST	CEILING	EGGGRATE	801	2015	-	20	18	24	24	-	-	30	PRICE	80		2., 3., 4., 6.
R1	RETURN/EXHAUST	CEILING	EGGGRATE	2016	2225	-	22	20	24	24	-	-	30	PRICE	80		2., 3., 4., 6.
R2	RETURN	SIDEWALL	LOUVERED	0	80	-	6	5	L+1-3/4	W+1-3/4	-	3/4	30	PRICE	60		2., 3., 4., 6.
R2	RETURN	SIDEWALL	LOUVERED	81	125	-	8	6	L+1-3/4	W+1-3/4	-	3/4	30	PRICE	60		2., 3., 4., 6.
R2	RETURN	SIDEWALL	LOUVERED	126	185	-	10	8	L+1-3/4	W+1-3/4	-	3/4	30	PRICE	60		2., 3., 4., 6.
R2	RETURN	SIDEWALL	LOUVERED	186	280	-	12	10	L+1-3/4	W+1-3/4	-	3/4	30	PRICE	60		2., 3., 4., 6.
R2	RETURN	SIDEWALL	LOUVERED	261	435	-	18	12	L+1-3/4	W+1-3/4	-	3/4	30	PRICE	60		2., 3., 4., 6.
R2	RETURN	SIDEWALL	LOUVERED	436	605	-	24	14	L+1-3/4	W+1-3/4	-	3/4	30	PRICE	60		2., 3., 4., 6.
R2	RETURN	SIDEWALL	LOUVERED	1250	1720	-	48	20	L+1-3/4	W+1-3/4	-	3/4	30	PRICE	60		2., 3., 4., 6.
T1	TRANSFER	SIDEWALL	LOUVERED	0	330	-	20	16	L+1-3/4	W+1-3/4	-	-	30	PRICE	ATG		2., 4., 6.
T1	TRANSFER	SIDEWALL	LOUVERED	331	600	-	26	20	L+1-3/4	W+1-3/4	-	-	30	PRICE	ATG		2., 4., 6.

GENERAL CONTROL NOTES									
1. CONTROL POINTS FOR MAU-1 SHALL BE VISIBLE THROUGH A BACNET NETWORK INTERFACE CARD. A POINTS LIST IS NOT PROVIDED. THE POINTS SHOWN ON THE DIAGRAM ON DWG M600 SHALL BE REPRESENTATIVE OF THE MINIMUM POINTS REQUIRED TO BE AVAILABLE THROUGH THE INTERFACE. THE MANUFACTURER SHALL PROVIDE THEIR STANDARD CONTROL SCHEME CLOSELY RELATED TO SEQUENCE DEFINED ON CONTROL DIAGRAM.									
2. CONTROL POINTS FOR DOAS-1 SHALL BE VISIBLE THROUGH A BACNET NETWORK INTERFACE CARD. A POINTS LIST IS NOT PROVIDED. THE POINTS SHOWN ON THE DIAGRAM ON DWG M600 SHALL BE REPRESENTATIVE OF THE MINIMUM POINTS REQUIRED TO BE AVAILABLE THROUGH THE INTERFACE. THE MANUFACTURER SHALL PROVIDE THEIR STANDARD CONTROL SCHEME CLOSELY RELATED TO SEQUENCE DEFINED ON CONTROL DIAGRAM.									
3. CONTROL POINTS FOR RTU-3 SHALL BE VISIBLE THROUGH A BACNET NETWORK INTERFACE CARD. A POINTS LIST IS NOT PROVIDED. THE POINTS SHOWN ON THE DIAGRAM ON DWG M603 SHALL BE REPRESENTATIVE OF THE MINIMUM POINTS REQUIRED TO BE AVAILABLE THROUGH THE INTERFACE. THE MANUFACTURER SHALL PROVIDE THEIR STANDARD CONTROL SCHEME CLOSELY RELATED TO SEQUENCE DEFINED ON CONTROL DIAGRAM.									
4. SEE EQUIPMENT SCHEDULES AND CONTROL DIAGRAMS FOR EQUIPMENT REQUIRING VFDs.									
5. CONTROL POINTS LISTS INCLUDE ALL POINTS FOR DIFFERENT EQUIPMENT TYPES. SEE CONTROL DIAGRAMS FOR THOSE POINTS ASSOCIATED WITH INDIVIDUAL PIECES OF EQUIPMENT.									

CHW AHU CONTROL POINTS LIST											
POINT DESCRIPTION	HARDWARE POINTS					SOFTWARE POINTS				GRAPHIC	
	AI	AO	BI	BO	AV	BV	SCHED	TREND	ALARM		
DISCHARGE AIR TEMPERATURE	X				X			X	X	X	
MIXED AIR TEMPERATURE	X				X			X	X	X	
RETURN AIR TEMPERATURE	X				X			X	X	X	
COOLING COIL AIR TEMPERATURE	X				X			X	X	X	
MINIMUM OUTSIDE AIR TEMPERATURE	X				X			X	X	X	
SUPPLY AIR STATIC PRESSURE	X				X			X	X	X	
DISCHARGE AIR HUMIDITY	X										
RETURN AIR HUMIDITY	X				X			X	X	X	
OUTSIDE AIR HUMIDITY	X				X						
OUTSIDE AIR TEMPERATURE	X							X	X	X	
SUPPLY FAN FLOW	X				X			X	X	X	
RETURN AIR FLOW	X				X			X	X	X	
FREEZE STAT			X			X		X	X	X	
SUPPLY STATIC HIGH LIMIT	X		X			X		X	X	X	
RETURN STATIC LOW LIMIT	X		X			X		X	X	X	
HUMIDITY HIGH LIMIT			X			X		X	X	X	
PRE-FILTER PRESSURE DROP	X						X	X	X	X	
FINAL FILTER PRESSURE DROP	X						X	X	X	X	
FIRE ALARM SHUTDOWN			X						X	X	
FIRE ALARM SMOKE EVACUATION			X						X	X	
COOLING COIL VALVE		X			X			X		X	
MIN. OSA COOLING COIL VALVE		X			X			X		X	
MIN. OSA HEATING COIL VALVE		X			X			X		X	
HUMIDIFIER VALVE		X			X			X		X	
OUTSIDE AIR DAMPER		X						X		X	
RETURN AIR DAMPER		X						X		X	
RELIEF AIR DAMPER		X						X		X	
MINIMUM OUTSIDE AIR DAMPER		X						X		X	
SUPPLY FAN SPEED		X			X			X		X	
RETURN FAN SPEED		X			X			X		X	
SUPPLY FAN ENABLE				X		X		X		X	
SUPPLY FAN STATUS		X						X	X	X	
SUPPLY FAN X - CFM FLOW	X					X		X	X	X	
RETURN FAN X - CFM FLOW	X					X		X	X	X	
VFD ALARM			X					X	X	X	
VFD HERTZ	X							X	X	X	
VFD AMPS	X							X	X	X	

DBP-1 CONTROL POINTS LIST													
POINT NAME	HARDWARE POINTS				SOFTWARE POINTS				ALARM	TREND	SCHEDULE	COLOR	GRAPHIC
	AI	AO	BI	BO	AV	BV							
DOM. HOT WATER RETURN TEMPERATURE									X	X			
DOM. HOT WATER SUPPLY TEMPERATURE									X	X			
DOM. HOT WATER PUMP 1 STATUS									X	X			
DOM. HOT WATER PUMP 2 STATUS									X	X			
DOM. HOT WATER PUMP 1 START/STOP									X	X			
DOM. HOT WATER PUMP 2 START/STOP									X	X			
HIGH DOM. HOT WATER SUPPLY TEMP.													
LOW DOM. HOT WATER SUPPLY TEMP.													
DOM. HOT WATER PUMP 1 FAILURE													
DOM. HOT WATER PUMP 1 RUNNING IN HAND													
DOM. HOT WATER PUMP 2 FAILURE													
DOM. HOT WATER PUMP 2 RUNNING IN HAND													
DOM. HOT WATER PUMP 1 RUNTIME EXCEEDED													
DOM. HOT WATER PUMP 2 RUNTIME EXCEEDED													

CHILLED WATER SYSTEM CONTROL POINTS LIST										
POINT DESCRIPTION	HARDWARE POINTS				SOFTWARE POINTS				ALARM	GRAPHIC
	AI	AO	BI	BO	AV	BV	SCHED	TREND		
CHILLER WATER DIFFERENTIAL PRESSURE	X							X		X
CHILLER 1 WATER FLOW	X							X		X
CHILLER 2 WATER FLOW	X							X		X
CHILLER 1 WATER RETURN TEMPERATURE	X							X		X
CHILLER 1 WATER SUPPLY TEMPERATURE		X						X		X
CHILLER 2 WATER RETURN TEMPERATURE			X					X	X	X
CHILLER 2 WATER SUPPLY TEMPERATURE			X					X		X
MAIN CHILLED WATER RETURN TEMPERATURE			X					X		X
MAIN CHILLED WATER SUPPLY TEMPERATURE			X					X		X
CHILLED WATER PUMP 1 VFD SPEED			X					X	X	X
CHILLED WATER PUMP 2 VFD SPEED			X					X	X	X
CHILLED WATER BYPASS VALVE			X					X		X
MAIN CHILLED WATER SUPPLY TEMPERATURE SETPOINT RESET				X				X		X
CHILLER 1 EMERGENCY SHUTDOWN				X				X		X
CHILLER 2 EMERGENCY SHUTDOWN				X				X		X
MAIN CHILLED WATER ISOLATION VALVE STATUS				X				X		X
CHILLED WATER PUMP 1 STATUS					X			X		X
CHILLED WATER PUMP 2 STATUS					X			X		X
CHILLED WATER PUMP 1 VFD					X					X
CHILLED WATER PUMP 2 VFD										X
CHILLED WATER PUMP 1 VFD ALARM								X		X
CHILLED WATER PUMP 2 VFD ALARM								X		
CHILLED WATER PUMP 1 VFD AMP								X	X	
CHILLED WATER PUMP 2 VFD AMP								X	X	
CHILLED WATER PUMP 1 VFD HZ								X	X	
CHILLED WATER PUMP 2 VFD HZ								X	X	
CHILLER 1 STATUS							X	X	X	
CHILLER 2 STATUS							X	X	X	
CHILLED WATER ISOLATION VALVE								X	X	
CHILLED WATER PUMP 1 START/STOP		X						X		X
CHILLED WATER PUMP 2 START/STOP		X						X		X
CHILLER 1 ENABLE		X								X
CHILLER 2 ENABLE									X	X
OUTSIDE AIR TEMPERATURE									X	X
CHILLED WATER DIFFERENTIAL PRESSURE SETPOINT								X	X	X
CHILLED WATER FLOW SETPOINT								X	X	X
CHILLED WATER ISOLATION VALVE FAILURE									X	
CHILLED WATER ISOLATION VALVE IN HAND									X	
CHILLED WATER PUMP 1 FAILURE									X	
CHILLED WATER PUMP 2 FAILURE				X						
CHILLED WATER PUMP 1 RUNNING IN HAND				X						
CHILLED WATER PUMP 2 RUNNING IN HAND				X						
HIGH CHILLED WATER DIFFERENTIAL PRESSURE				X						
LOW CHILLED WATER DIFFERENTIAL PRESSURE				X						
LOW CHILLED WATER				X						
CHILLER 1 RUNNING IN HAND				X						
CHILLER 2 RUNNING IN HAND				X						
HIGH MAIN CHILLED WATER SUPPLY TEMPERATURE				X						
LOW MAIN CHILLED WATER SUPPLY TEMPERATURE				X						
HIGH MAIN CHILLED WATER RETURN TEMPERATURE				X						
LOW MAIN CHILLED WATER RETURN TEMPERATURE				X						
CHILLER 1 FAILURE				X						X
CHILLER 2 FAILURE				X						X
LEAD CHILLER FAILURE				X						X
				X						
				X						

SINGLE ZONE VAV CHW AHU CONTROL POINT...

POINT DESCRIPTION	HARDWARE POINTS				SOFTWARE POINTS				ALARM	TREND	GRAPHIC
	AI	AO	BI	BO	AV	BV	SCHED				
FILTER DIFFERENTIAL PRESSURE	X							X		X	
BUILDING STATIC PRESSURE	X							X		X	
OUTSIDE AIRFLOW	X							X		X	
DISCHARGE AIR TEMPERATURE	X							X		X	
RETURN AIR TEMPERATURE	X							X		X	
ZONE TEMPERATURE	X							X		X	
MIXED AIR TEMPERATURE	X							X		X	
SUPPLY AIR CARBON DIOXIDE	X							X		X	
RETURN AIR HUMIDITY								X		X	
SUPPLY FAN VFD SPEED		X						X		X	
NATURAL GAS HEATING COIL VALVE		X						X		X	
COOLING COIL VALVE		X						X		X	
ZONE SETPOINT ADJUSTMENT		X						X		X	
OUTSIDE AIR DAMPER		X						X		X	
RETURN AIR DAMPER		X						X		X	
EXHAUST AIR DAMPER		X						X		X	
SUPPLY FAN START/STOP				X				X		X	
HIGH STATIC					X						
SUPPLY FAN STATUS				X				X		X	
SUPPLY FAN VFD ALARM								X			
SMOKE DETECTOR (RETURN)					X	X					
SMOKE DETECTOR (SUPPLY)					X	X					
CONDENSATE SAFETY SWITCH			X					X	X	X	

CHW FCU CONTROL POINTS LIST

POINT DESCRIPTION	HARDWARE POINTS				SOFTWARE POINTS				ALARM	TREND	GRAPHIC
	AI	AO	BI	BO	AV	BV	SCHED				
HEATING STAGE 1	X							X		X	
SCHEDULE								X		X	
ZONE TEMPERATURE	X							X		X	
ZONE TEMPERATURE ADJUST	X							X		X	
DISCHARGE AIR TEMPERATURE	X							X		X	
ZONE HUMIDITY	X							X		X	
HEATING SETPOINT								X		X	
COOLING SETPOINT		X						X		X	
FAN SPEED		X						X		X	
CHILLED WATER VALVE			X					X		X	
FAN STATUS								X		X	
HIGH ZONE HUMIDITY								X		X	
LOW ZONE HUMIDITY								X		X	
HIGH ZONE TEMPERATURE								X		X	
LOW ZONE TEMPERATURE								X		X	
HIGH DISCHARGE TEMPERATURE								X		X	
LOW DISCHARGE TEMPERATURE								X		X	
FILTER CHANGE REQUIRED								X		X	
FAN RUNNING IN HAND								X		X	
FAN FAILURE								X		X	

CONTROLS ABBREVIATIONS

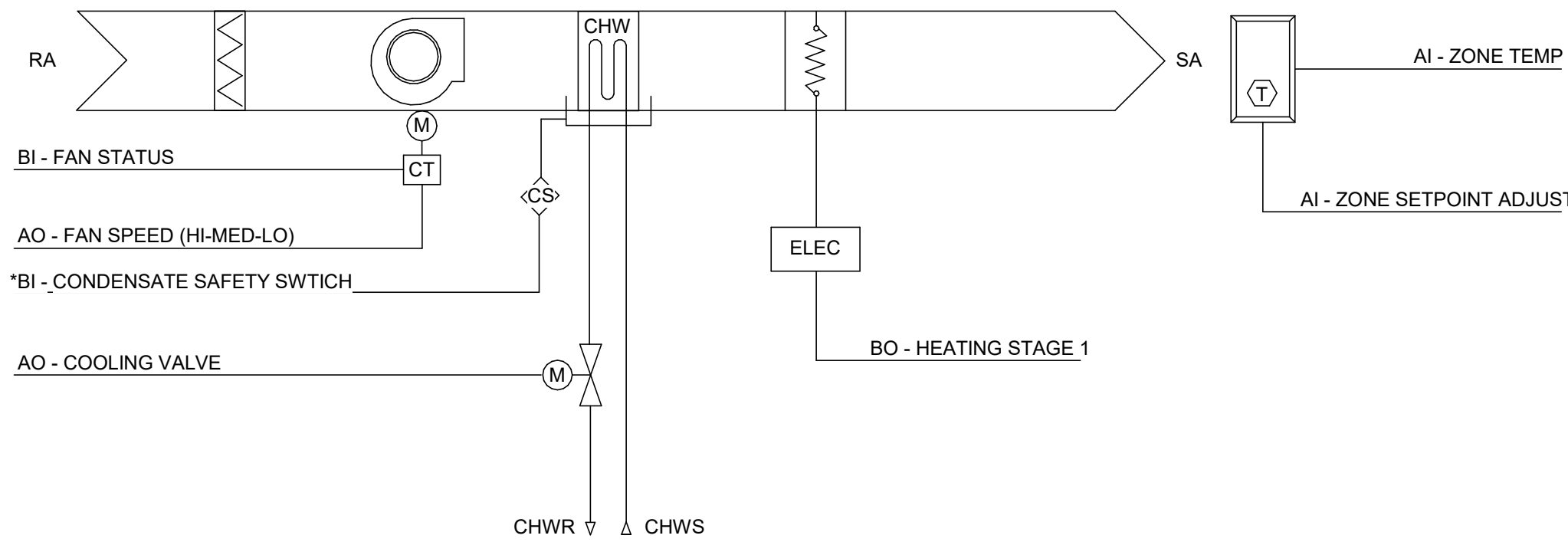
ABBREVIATION	ABBREVIATED TERMS
AI	- ANALOG INPUT
AO	- ANALOG OUTPUT
ASC	- APPLICATION SPECIFIC CONTROLLER
CR	- CONTROL RELAY
CT	- CURRENT TRANSDUCER SENSOR
DAT	- DISCHARGE AIR TEMPERATURE
DDC	- DIRECT DIGITAL CONTROL
DI	- DIGITAL INPUT
DO	- DIGITAL OUTPUT
DP	- DIFFERENTIAL PRESSURE
EAT	- ENTERING AIR TEMPERATURE
LAN	- LOCAL AREA NETWORK
LAT	- LEAVING AIR TEMPERATURE
MAT	- MIXED AIR TEMPERATURE
PID	- PROPORTIONAL INTEGRAL DERIVATIVE
RAT	- RETURN AIR TEMPERATURE
VFD	- VARIABLE FREQUENCY DRIVE

VFD CONTROL POINTS LIST

POINT DESCRIPTION	HARDWARE POINTS				SOFTWARE
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1 HORIZONTAL CHILLED WATER FAN COIL WITH ELECTRIC REHEAT CONTROL DIAGRAM

SCALE: N.T.S.



HORIZONTAL CHILLED WATER FAN COIL UNIT WITH ELECTRIC REHEAT- SEQUENCE OF OPERATION (FCU'S TYPICAL FOR ALL EXCEPT HOTEL GUESTROOM FCU'S):

RUN CONDITIONS:
THE UNIT SHALL ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:

- OCCUPIED MODE: THE UNIT SHALL MAINTAIN
 - A 74°F (ADJ.) COOLING SETPOINT
 - A 70°F (ADJ.) HEATING SETPOINT
- UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN
 - A 85°F (ADJ.) COOLING SETPOINT
 - A 55°F (ADJ.) HEATING SETPOINT

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).
- LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

ZONE SETPOINT ADJUST:
THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING AND COOLING SETPOINTS AT THE ZONE SENSOR.

ZONE OPTIMAL START:
THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

SUPPLY FAN:
THE FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. THE FAN SPEEDS SHALL AUTOMATICALLY BE INDEXED AS FOLLOWS:

- LOW SPEED SHALL RUN ANYTIME THE ZONE TEMPERATURE IS WITHIN SETPOINTS.
- MEDIUM SPEED SHALL RUN ANYTIME THE ZONE TEMPERATURE IS OUTSIDE OF SETPOINTS.
- HIGH SPEED SHALL RUN ANYTIME THE ZONE TEMPERATURE IS OUTSIDE OF SETPOINTS BY A DEFINABLE AMOUNT (ADJ.).

COOLING COIL VALVE:
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE COOLING COIL VALVE TO MAINTAIN ITS COOLING SETPOINT.

THE COOLING SHALL BE ENABLED WHENEVER:

- THE ZONE TEMPERATURE IS ABOVE COOLING SETPOINT AND THE FAN IS ON
- LOW DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS LESS THAN 40°F (ADJ.).

FAN STATUS:
THE CONTROLLER SHALL MONITOR THE FAN STATUS. ALARMS SHALL BE PROVIDED AS FOLLOWS:

- FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

ELECTRIC HEATING STAGE:
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND STAGE THE HEATING TO MAINTAIN ITS HEATING SETPOINT. TO PREVENT SHORT CYCLING, THE STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME. THE HEATING SHALL BE ENABLED WHENEVER:

- THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT
- THE FAN IS ON.

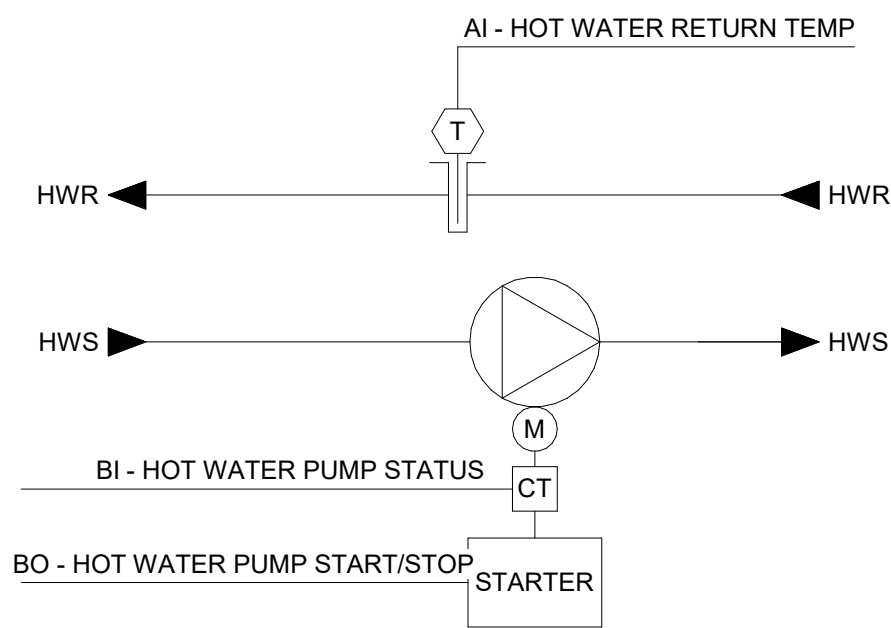
FILTER HOURS:
THE CONTROLLER SHALL MONITOR THE FAN RUNTIME. ALARMS SHALL BE PROVIDED AS FOLLOWS:

- FILTER CHANGE REQUIRED: FILTER HAS BEEN IN USE FOR MORE THAN 2200 HRS (ADJ.).

CONDENSATE SAFETY SWITCH:
PROVIDE CONDENSATE SAFETY SWITCH IN CONDENSATE DRAIN OF UNIT. SHUT DOWN UNIT ON SWITCH CLOSURE AND PROVIDE ALARM TO BUILDING AUTOMATION SYSTEM.

2 DOMESTIC HOT WATER PUMP CONTROL DIAGRAM

SCALE: N.T.S.



DOMESTIC HOT WATER PUMP (DHWP-1, 2)

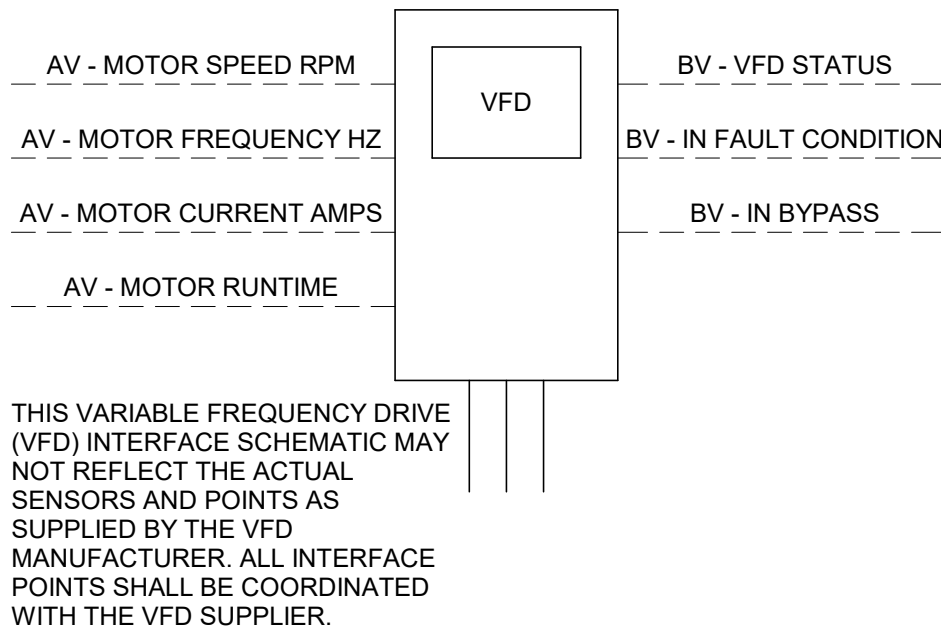
SEQUENCE OF OPERATION:

RUN CONDITIONS:
THE HOT WATER PUMPS SHALL BE ENABLED WHENEVER RETURN WATER TEMPERATURE IS LESS THAN 100°F (ADJ.).

TO PREVENT SHORT CYCLING, THE PUMPS SHALL RUN FOR AND BE OFF FOR MINIMUM ADJUSTABLE TIMES (BOTH USER DEFINABLE).

STOP CONDITIONS:

THE HOT WATER PUMPS SHALL BE DISABLED WHENEVER RETURN WATER TEMPERATURE REACHES THAN 110°F (ADJ.).



VARIABLE FREQUENCY DRIVE (VFD) SEQUENCE OF OPERATION:

CURRENT VFD STATUS AND OPERATING CONDITIONS SHALL BE MONITORED THROUGH ITS COMMUNICATIONS INTERFACE PORT. THE INTERFACE SHALL MONITOR AND TREND THE POINTS AS SHOWN ON THE POINTS LIST.

3 VARIABLE FREQUENCY DRIVE CONTROL DIAGRAM

SCALE: N.T.S.

VAV TERMINAL UNIT - SEQUENCE OF OPERATION (VAV-1,2,3,4,5):

RUN CONDITIONS: THE UNIT SHALL ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:

- OCCUPIED MODE: THE UNIT SHALL MAINTAIN A 75°F (ADJ.) COOLING SETPOINT AND A 70°F (ADJ.) HEATING SETPOINT.
- UNOCCUPIED MODE: THE UNIT SHALL MAINTAIN AN 85°F (ADJ.) COOLING SETPOINT AND A 55°F (ADJ.) HEATING SETPOINT.

ZONE SETPOINT ADJUST: THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING AND COOLING SETPOINTS AT THE ZONE SENSOR. THE ADJUSTMENT SHALL NOT BE MORE THAN 2°F (ADJ.) FROM THE TEMPERATURES OUTLINED IN THE PARAGRAPH B ABOVE.

ZONE UNOCCUPIED OVERRIDE: A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE TIME INTERVAL. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.

ZONE OPTIMAL START: THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD. OPTIMAL START HEATING SETPOINT SHALL BE 3°F (ADJ.) BELOW THE OCCUPIED MODE SETPOINT.

PRIMARY AIR DAMPER CONTROL: THE UNIT SHALL MAINTAIN ZONE SETPOINTS BY CONTROLLING THE AIRFLOW THROUGH ONE OF THE FOLLOWING:

- OCCUPIED MODE:
 - WHEN THE ZONE TEMPERATURE IS GREATER THAN ITS COOLING SETPOINT, THE ZONE DAMPER SHALL MODULATE BETWEEN THE MINIMUM (ADJ.) & MAXIMUM (ADJ.) AIRFLOW UNTIL THE ZONE IS SATISFIED.
- UNOCCUPIED MODE:
 - WHEN THE ZONE TEMPERATURE IS LESS THAN ITS HEATING SETPOINT, THE CONTROLLER SHALL ENABLE HEATING TO MAINTAIN THE ZONE TEMPERATURE AT ITS HEATING SETPOINT AT HEATING CFM AIR QUANTITY.

- UNOCCUPIED MODE:
 - WHEN THE ZONE IS UNOCCUPIED THE ZONE DAMPER SHALL BE ALLOWED TO FULLY CLOSE.
- WHEN THE ZONE TEMPERATURE IS GREATER THAN ITS COOLING SETPOINT, THE ZONE DAMPER SHALL MODULATE BETWEEN THE MINIMUM (ADJ.) AND MAXIMUM (ADJ.) AIRFLOW UNTIL THE ZONE MEETS OCCUPIED MODE TEMPERATURE SETPOINT. ONE OCCUPIED MODE SETPOINT IS REACHED, THE SETPOINT SHALL RETURN TO UNOCCUPIED MODE.
- WHEN THE ZONE TEMPERATURE IS LESS THAN ITS HEATING SETPOINT, THE CONTROLLER SHALL ENABLE HEATING TO MAINTAIN THE ZONE TEMPERATURE 3°F BELOW ITS HEATING SETPOINT AT HEATING CFM AIR QUANTITY.

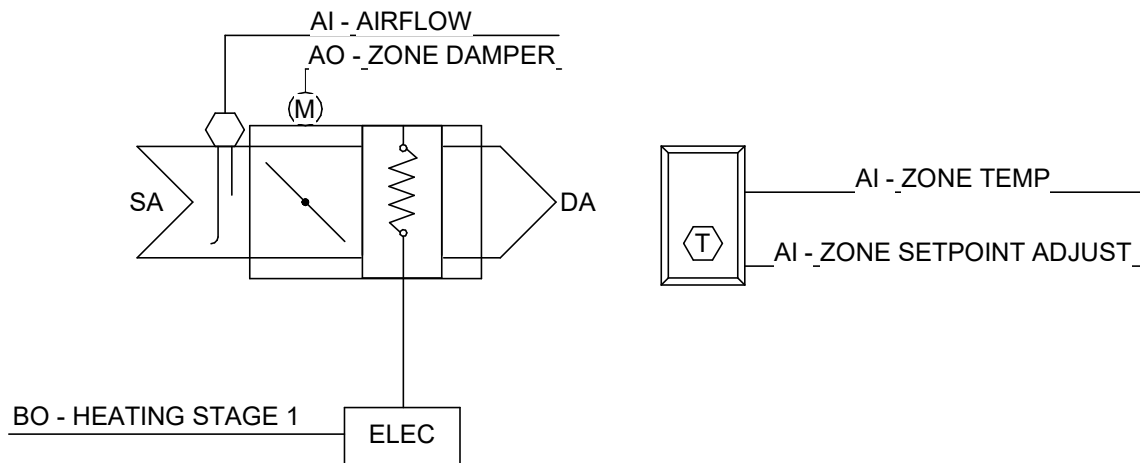
ELECTRIC HEATING STAGE:

THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND STAGE THE HEATING TO MAINTAIN ITS HEATING SETPOINT. TO PREVENT SHORT CYCLING, THE STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME. THE HEATING SHALL BE ENABLED WHENEVER:

- THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT

4 VARIABLE AIR VOLUME TERMINAL UNIT CONTROL DIAGRAM

SCALE: N.T.S.

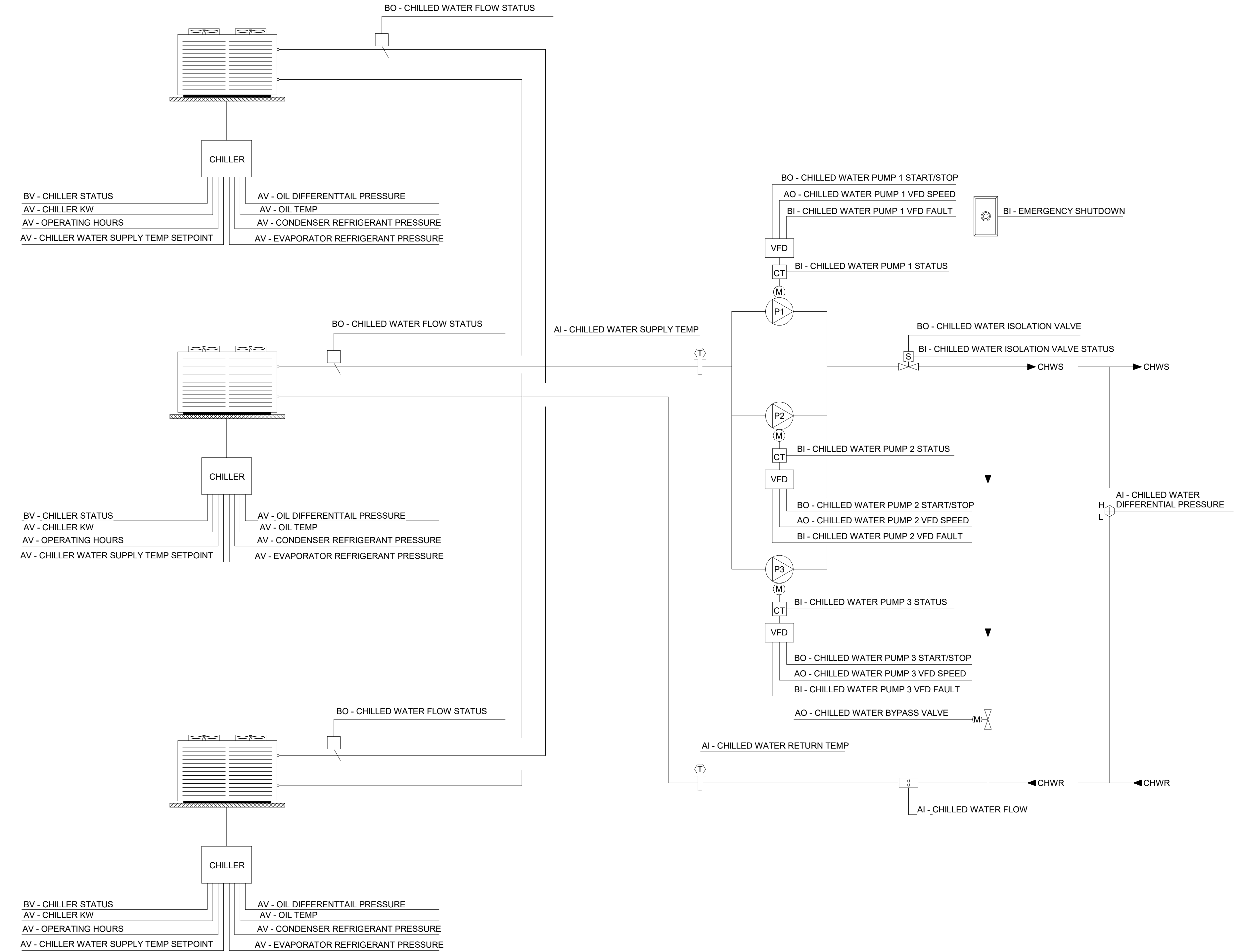


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REVISION HISTORY				

MECHANICAL CONTROLS 2

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TEAM: MEI
CHECKER: RS
SCALE: AS NOTED
ISSUED: 06/05/2018



3 CENTRAL COOLING PLANT POINTS LIST 3

SCALE: 1/4" = 1'-0"

OUTSIDE AIR SENSOR SEQUENCE OF OPERATION:

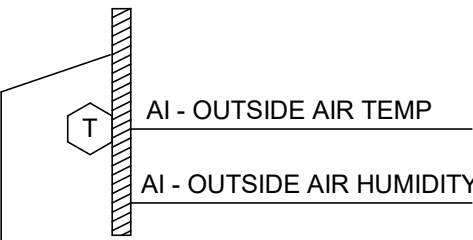
THE CONTROLLER SHALL MONITOR THE OUTSIDE AIR TEMPERATURE AND HUMIDITY AND CALCULATE THE OUTSIDE AIR ENTHALPY ON A CONTINUAL BASIS. THESE VALUES SHALL BE MADE AVAILABLE TO THE SYSTEM AT ALL TIMES.

IF AN OA TEMP SENSOR CANNOT BE READ, A DEFAULT VALUE OF 65°F WILL BE USED.

IF AN OA HUMIDITY SENSOR CANNOT BE READ, A DEFAULT VALUE OF 50 % WILL BE USED.

OUTSIDE AIR TEMPERATURE HISTORY:

THE CONTROLLER SHALL MONITOR AND RECORD THE HIGH AND LOW TEMPERATURE READINGS FOR THE OUTSIDE AIR. THESE READINGS SHALL BE RECORDED ON A DAILY, MONTH-TO-DATE, AND YEAR-TO-DATE BASIS.



4 OUTSIDE AIR SENSOR CONTROL DIAGRAM

SCALE: N.T.S.

AIR COOLED CHILLER PLANT CONTROL - SEQUENCE OF OPERATION (CH-1.CH-2):

CHILLER - RUN CONDITIONS:

THE CHILLER SHALL BE ENABLED TO RUN WHENEVER:

- A DEFINABLE NUMBER OF CHILLED WATER COILS NEED COOLING
- THE OUTSIDE AIR TEMPERATURE IS GREATER THAN 40°F (ADJ.).

TO PREVENT SHORT CYCLING, THE CHILLER SHALL RUN FOR AND BE OFF FOR MINIMUM ADJUSTABLE TIMES (BOTH USER DEFINABLE), UNLESS SHUTDOWN ON SAFETIES OR OUTSIDE AIR CONDITIONS. THE CHILLER SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS.

CHILLER LEAD/LAG OPERATION:

THE TWO CHILLERS SHALL OPERATE IN A LEAD/LAG FASHION. THE FOLLOWING SETPOINTS ARE RECOMMENDED VALUES. ALL SETPOINTS SHALL BE FIELD ADJUSTED DURING THE COMMISSIONING PERIOD TO MEET THE REQUIREMENTS OF ACTUAL FIELD CONDITIONS.

TO PREVENT SHORT CYCLING, THERE SHALL BE A USER DEFINABLE DELAY (ADJ.) BETWEEN STAGING UP OR DOWN, UNLESS SHUTDOWN ON SAFETIES OR FAILURE. EACH CHILLER SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS.

THE LEAD CHILLER SHALL RUN FIRST.

ON FAILURE OF THE LEAD CHILLER, THE LAG CHILLER SHALL RUN AND THE LEAD CHILLER SHALL TURN OFF.

ON INCREASING MAIN CHILLED WATER SUPPLY TEMPERATURE ABOVE 52°F (ADJ.), THE LAG CHILLER SHALL STAGE ON AND RUN IN UNISON WITH THE LEAD CHILLER TO MAINTAIN CHILLED WATER TEMPERATURE SETPOINT.

THE DESIGNATED LEAD CHILLER SHALL ROTATE UPON ONE OF THE FOLLOWING CONDITIONS (USER SELECTABLE):

- MANUALLY THROUGH A SOFTWARE SWITCH
- DAILY
- WEEKLY
- MONTHLY

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- CHILLER 1 FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- CHILLER 2 FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- LEAD CHILLER FAILURE: THE LEAD CHILLER IS IN FAILURE AND THE LAG CHILLER IS ON.
- HIGH MAIN CHILLED WATER SUPPLY TEMP: IF THE MAIN CHILLED WATER SUPPLY TEMPERATURE IS GREATER THAN 56°F (ADJ.).
- LOW MAIN CHILLED WATER SUPPLY TEMP: IF THE MAIN CHILLED WATER SUPPLY TEMPERATURE IS LESS THAN 38°F (ADJ.).
- HIGH MAIN CHILLED WATER RETURN TEMP: IF THE MAIN CHILLED WATER RETURN TEMPERATURE IS GREATER THAN 68°F (ADJ.).
- LOW MAIN CHILLED WATER RETURN TEMP: IF THE MAIN CHILLED WATER RETURN TEMPERATURE IS LESS THAN 47°F (ADJ.).

EMERGENCY SHUTDOWN:

THE CHILLER SHALL SHUT DOWN AND AN ALARM GENERATED UPON RECEIVING AN EMERGENCY SHUTDOWN SIGNAL STATUS.

CHILLED WATER ISOLATION VALVE:

THE VALVE SHALL OPEN ANYTIME THE CHILLER IS CALLED TO RUN. THE VALVE SHALL ALSO OPEN WHENEVER THE CHILLED WATER PUMP RUNS FOR FREEZE PROTECTION. THE VALVE SHALL OPEN PRIOR TO THE CHILLER BEING ENABLED AND SHALL CLOSE ONLY AFTER THE CHILLER IS DISABLED. THE VALVE SHALL THEREFORE HAVE:

- A USER ADJUSTABLE DELAY ON START.
- A USER ADJUSTABLE DELAY ON STOP.

THE DELAY TIMES SHALL BE SET APPROPRIATELY TO ALLOW FOR ORDERLY CHILLED WATER SYSTEM START-UP, SHUTDOWN AND SEQUENCING.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- FAILURE: VALVE COMMANDED OPEN BUT THE STATUS INDICATES CLOSED.
- OPEN IN HAND: VALVE COMMANDED CLOSED BUT THE STATUS INDICATES OPEN.

CHILLED WATER PUMP LEAD/STANDBY OPERATION:

THE TWO CHILLED WATER PUMPS SHALL RUN ANYTIME THE CHILLER IS CALLED TO RUN. THE CHILLED WATER PUMP SHALL ALSO RUN FOR FREEZE PROTECTION WHENEVER THE OUTSIDE AIR TEMPERATURE IS LESS THAN A USER DEFINABLE SETPOINT (32°F - ADJ.).

THE LEAD PUMP SHALL START PRIOR TO THE CHILLER BEING ENABLED AND SHALL STOP ONLY AFTER THE CHILLER IS DISABLED. THE PUMP(S) SHALL THEREFORE HAVE:

- A USER ADJUSTABLE DELAY ON START.
- A USER ADJUSTABLE DELAY ON STOP.

THE DELAY TIMES SHALL BE SET APPROPRIATELY TO ALLOW FOR ORDERLY CHILLED WATER SYSTEM START-UP, SHUTDOWN AND SEQUENCING. CHILLED WATER PUMP LEAD/LAG OPERATION:

THE TWO VARIABLE SPEED CHILLED WATER PUMPS SHALL OPERATE IN A LEAD/LAG FASHION.

- THE LEAD PUMP SHALL RUN FIRST.
- ON FAILURE OF THE LEAD PUMP, THE LAG PUMP SHALL RUN AND THE LEAD PUMP SHALL TURN OFF.

ON DECREASING CHILLED WATER DIFFERENTIAL PRESSURE, THE LAG PUMP SHALL STAGE ON AND RUN IN UNISON WITH THE LEAD PUMP TO MAINTAIN CHILLED

THE DESIGNATED LEAD PUMP SHALL ROTATE UPON ONE OF THE FOLLOWING CONDITIONS (USER SELECTABLE):

- MANUALLY THROUGH A SOFTWARE SWITCH
- DAILY
- WEEKLY
- MONTHLY

ALARMS SHALL BE PROVIDED AS FOLLOWS:

CHILLED WATER PUMP 1

- FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- VFD FAULT.

CHILLED WATER PUMP 2

- FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- VFD FAULT.

CHILLED WATER DIFFERENTIAL PRESSURE CONTROL:

THE CONTROLLER SHALL MEASURE CHILLED WATER DIFFERENTIAL PRESSURE AND MODULATE THE LEAD CHILLED WATER PUMP VFD TO MAINTAIN ITS CHILLED WATER DIFFERENTIAL PRESSURE SETPOINT. THE FOLLOWING SETPOINTS ARE RECOMMENDED VALUES. ALL SETPOINTS SHALL BE FIELD ADJUSTED DURING THE COMMISSIONING PERIOD TO MEET THE REQUIREMENTS OF ACTUAL FIELD CONDITIONS.

THE CONTROLLER SHALL MODULATE CHILLED WATER PUMP SPEED TO MAINTAIN A CHILLED WATER DIFFERENTIAL PRESSURE OF 12LBF/IN2 (ADJ.). THE VFD MINIMUM SPEED SHALL NOT DROP BELOW 10% (ADJ.). ON DROPPING CHILLED WATER DIFFERENTIAL PRESSURE, THE VFDS SHALL STAGE ON AND RUN TO MAINTAIN SETPOINT AS FOLLOWS:

- THE CONTROLLER SHALL MODULATE THE LEAD VFD TO MAINTAIN SETPOINT.
- IF THE LEAD VFD SPEED IS GREATER THAN A SETPOINT OF 90% (ADJ.), THE LAG VFD SHALL STAGE ON.
- THE LAG VFD SHALL RAMP UP TO MATCH THE LEAD VFD SPEED AND THEN RUN IN UNISON WITH THE LEAD VFD TO MAINTAIN SETPOINT.

ON RISING CHILLED WATER DIFFERENTIAL PRESSURE, THE VFDS SHALL STAGE OFF AS FOLLOWS:

- IF THE VFDS SPEEDS THEN DROPS BACK TO 60% (ADJ.) BELOW SETPOINT, THE LAG VFD SHALL STAGE OFF.
- THE LEAD VFD SHALL CONTINUE TO RUN TO MAINTAIN SETPOINT.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH CHILLED WATER DIFFERENTIAL PRESSURE: IF THE CHILLED WATER DIFFERENTIAL PRESSURE IS 25% (ADJ.) GREATER THAN SETPOINT.
- LOW CHILLED WATER DIFFERENTIAL PRESSURE: IF THE CHILLED WATER DIFFERENTIAL PRESSURE IS 25% (ADJ.) LESS THAN SETPOINT.

CHILLED WATER BYPASS VALVE - MINIMUM FLOW CONTROL:

THE CONTROLLER SHALL MEASURE CHILLED WATER FLOW THROUGH THE CHILLER AND, AS THE CHILLED WATER FLOW DROPS BELOW SETPOINT, THE CONTROLLER SHALL MODULATE THE CHILLED WATER BYPASS VALVE OPEN TO MAINTAIN THE MINIMUM CHILLED WATER FLOW SETPOINT. ALARMS SHALL BE PROVIDED AS FOLLOWS:

- LOW CHILLED WATER FLOW: IF THE CHILLED WATER FLOW IS 25% (ADJ.) LESS THAN SETPOINT.

CHILLER START-UP:

THE CHILLER SHALL BE ENABLED AT A USER ADJUSTABLE TIME AFTER PUMP STATUSES ARE PROVEN ON. THE CHILLER SHALL THEREFORE HAVE A USER ADJUSTABLE DELAY ON START.

THE DELAY TIME SHALL BE SET APPROPRIATELY TO ALLOW FOR ORDERLY CHILLED WATER SYSTEM START-UP, SHUTDOWN AND SEQUENCING.

THE CHILLER SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- CHILLER FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- CHILLER RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

CHILLED WATER SUPPLY TEMPERATURE - SETPOINT RESET:

THE CHILLED WATER SUPPLY TEMPERATURE SETPOINT SHALL RESET USING A TRIM AND RESPOND ALGORITHM BASED ON COOLING REQUIREMENTS.

THE CHILLED WATER SUPPLY TEMPERATURE SETPOINT SHALL RESET TO A LOWER VALUE AS THE FACILITY'S CHILLED WATER VALVES OPEN BEYOND A USER DEFINABLE THRESHOLD (90% OPEN, TYP.). ONCE THE CHILLED WATER COILS ARE SATISFIED (VALVES CLOSING) THEN THE CHILLED WATER SUPPLY TEMPERATURE SETPOINT SHALL GRADUALLY RISE OVER TIME TO REDUCE COOLING ENERGY USE.

CHILLED WATER TEMPERATURE MONITORING:

THE FOLLOWING TEMPERATURES SHALL BE MONITORED:

- CHILLED WATER SUPPLY.
- CHILLED WATER RETURN.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH CHILLED WATER SUPPLY TEMP: IF THE CHILLED WATER SUPPLY TEMPERATURE IS GREATER THAN 55°F (ADJ.).
- LOW CHILLED WATER SUPPLY TEMP: IF THE CHILLED WATER SUPPLY TEMPERATURE IS LESS THAN 36°F (ADJ.).

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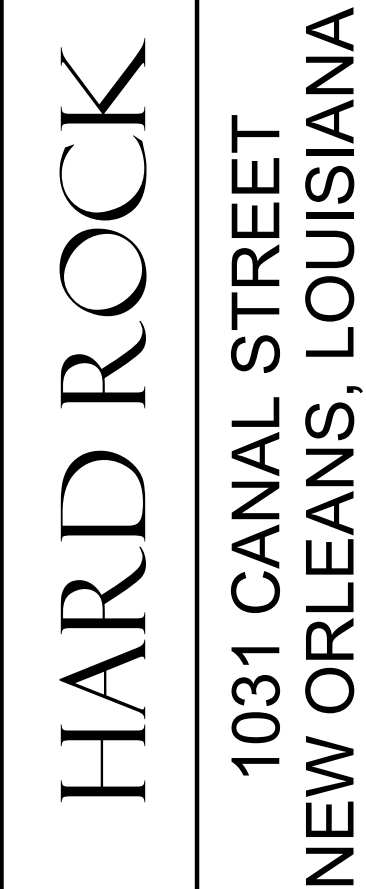
MECHANICAL CONTROLS 3

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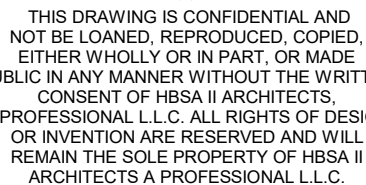
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ENGINEERS

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M7.3



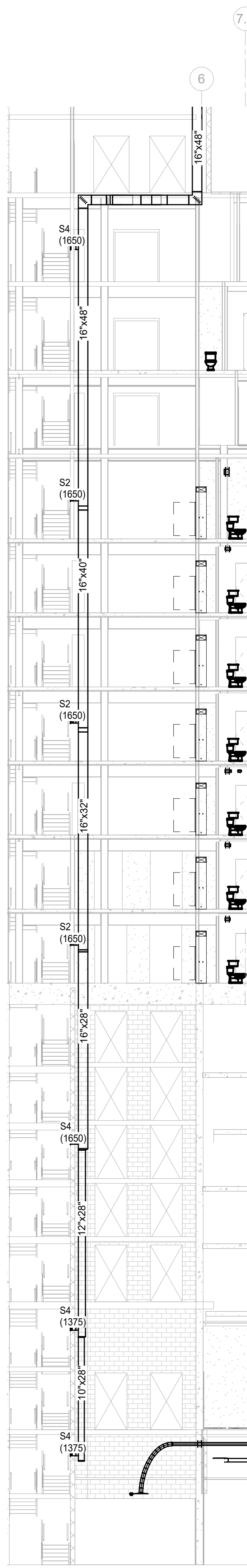
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[illegible]STAIR PRESSURIZATION
RISER DIAGRAM

PROJECT#: 1709
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TEAM: MEI
CHECKER: RS
SCALE: AS NOTED
ISSUED: 06/05/2018

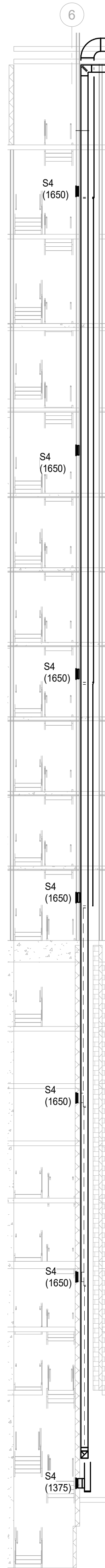


M8.1



1 NORTH STAIRWELL - SECTION A-A

SCALE: 3/32" = 1'-0"



2 SOUTH STAIRWELL - SECTION B-B

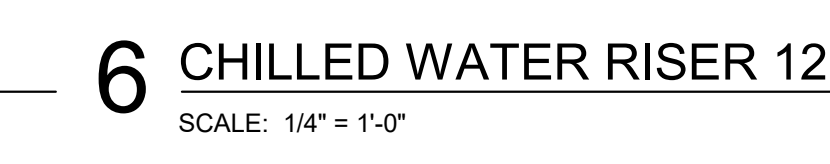
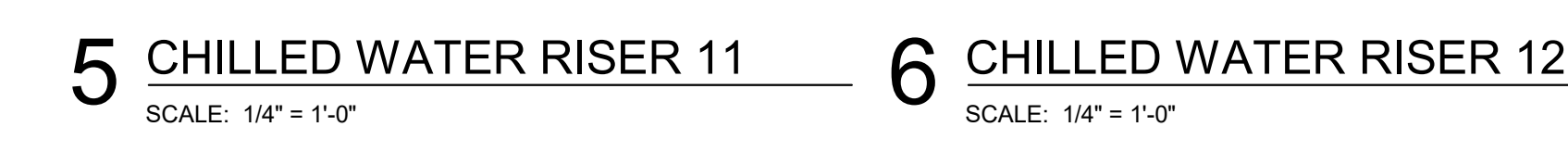
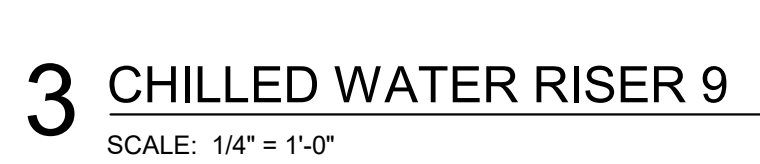
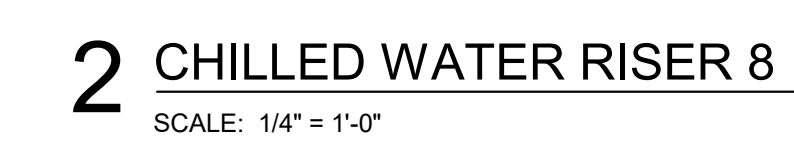
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MECHANICAL WATER RISER DIAGRAMS

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M8.5